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July 1977

VOLUME 45, NUMBER 1 (FOURTH SERIES)

TRANSACTIONS & STUDIES

of THE COLLEGE OF PHYSICIANS OF PHILADELPHIA

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PATIENT PACKAGE INSERTS

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TRANSACTIONS & STUDIES

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Volume 45
(Fourth Series)

Number 1
July 1977

'Hail and Farewell' to the Editor, Robert Erwin Jones, M.D.

By FRED B. ROGERS, M.D.*

I was honored at the end of my ten-year editorship of the *Transactions & Studies,* in April 1966, to rate a written tribute from Dr. W. B. McDaniel, 2d, distinguished former editor of this journal. And now, as my successor, Dr. Robert Erwin Jones, bids farewell to the office, it is a pleasure to salute his performance during the past eleven years.

First issued in the year 1793, the "T. & S." is, like many other Philadelphia contributions, an old number. Dignified in appearance and broad in scope, this periodical transmits the activities of the College of Physicians throughout the world. It provides a varied fare, aiming to serve up something of interest to each reader. Although a quarterly publication, and therefore not "last minute" in news impact, our journal has remained consistently on the National Library of Medicine's often-sought periodicals list — evidence of its quality and popularity. Because of the numerous articles of lasting value tucked between its covers, past issues of the T. & S. are often as interesting to read as recent ones. And all back volumes are now available on microfilm for scholarly use.

Too few readers appreciate the editor's work as they peruse the finished product. With T. & S. in particular, the task is largely a 'one-man job.' For it is the editor who gathers, refines and sows the varying copy in palatable form. This involves diplomacy and perseverance in obtaining material, literary and scientific skill in editing, plus an awareness of readers' tastes. In all of these realms Dr. Jones has done well. His active role in the College, scholarly background (which includes a Phi Beta Kappa key from Williams College), and Bicentennial year presidency of the Philadelphia Psychiatric Society all denote high achievement.

And now Dr. Jones joins the impressive list of former editors — a line begun appropriately by Dr. Benjamin Rush. For it was Bob Jones, more than anyone else, who led the successful effort to establish the Benjamin Rush State Park in northeast Philadelphia. A worthy follower of the great Dr. Rush, our parting editor has earned accolades for outstanding accomplishments. To his successor he extends a tradition of excellence for the future.

*Temple University School of Medicine, Philadelphia, Pa. 19140.

Patient Package Inserts: A Symposium*

INTRODUCTION

By WILLIAM R. BARCLAY, M.D.†

Consumer groups and the Food and Drug Administration (FDA) have advocated that prescription drugs be dispensed together with accompanying printed information, usually referred to as a patient package insert (PPI). This labeling material would be directed to the consumer rather than the prescriber and would supplement the official labeling that now must exist to put a drug legally into interstate commerce, but practically it would serve as a guide to health professionals who prescribe, distribute, and administer drugs.

There is little question that the PPI will soon be recognized officially for the most commonly prescribed drugs; they already exist for birth control pills, insulin, and estrogens. Furthermore, the concept is not opposed by the Pharmaceutical Manufacturers Association (PMA) or the American Medical Association (AMA). In fact, the AMA collaborated with the FDA and the College of Obstetrics and Gynecology in writing the patient labeling for birth control pills ("What You Should Know About the Pill").

At present, however, there is no general agreement on what drugs will be addressed by PPIs, the information that will be disclosed, the form of the insert (a label attached to the container, a leaflet, or a pamphlet), who will provide them to the patient, and who will write them. Two things are certain: their cost will be paid by the consumer and the FDA will exercise ultimate control over their content.

At this point one might speculate on whether or not PPIs might move some drugs from prescription items to over-the-counter (OTC) items. The definition of an OTC drug is that it can be used effectively and safely by printed directions without medical supervision. This is an important issue, for if the PPI is to be a complete disclosure that is fully comprehensible to the patient and if its information is to supersede the professional judgment and experience of the physician, then the drug should be procurable as an OTC item. If, on the other hand, the PPI is to reinforce the physician's instructions, supplement his guidance, and strengthen, not weaken, the patient-doctor relationship, then PPIs should be prepared in consultation with practicing physicians and should be printed only with the endorsement of the professional associations that represent those physicians.

In examining the proposals put forward by the FDA on this matter, the AMA has asked the following pertinent questions:

1. Will these package inserts improve patient compliance in the taking of prescription drugs?
2. Will they reduce the incidence of side effects from drugs?
3. Will this type of information lessen undesirable drug reactions?
4. Will the disclosure of adverse side effects be so alarming as to discourage use of the drug even when it may be vitally needed?

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*Sponsored by the Greater Philadelphia Committee for Medical-Pharmaceutical Sciences, under the aegis of the College of Physicians of Philadelphia, January 20, 1977.

†Editor, *Journal of the American Medical Association*, 535 North Dearborn Street, Chicago, Illinois 60610.

5. Will the form and content be so technical that they will be incomprehensible to a great many people?
6. Will patients read them?
7. Who will provide these documents to the patients?
8. Who will have the responsibility of writing the PPIs and keeping them up-to-date?
9. What adverse legal consequences and therapeutic consequences might ensue if the physician disagrees with the recommended usage printed in the insert?

Some of these questions should be answered before embarking on the project of preparing PPIs. Others will be answered only through evaluation after the inserts have been made available in the marketplace.

The AMA Staff have made several recommendations, developed from their experience in preparing the pamphlet "What You Should Know About the Pill" and from broad experience in preparing health information for the public. First, the PPI should be so written as to assist the physician in instructing the patient on the appropriate use of the drug. It should be couched in simple, straight-forward language and should allow a broad latitude of dosage and dosage schedules. Second, it should not list *all* the complications and adverse side effects but only the more common and more serious. In this regard it would be more useful if the signs and symptoms of adverse side effects were described with the direction to "immediately contact your doctor if this occurs." The patient should not be given a list of pathologic conditions and be required to make a professional judgment he has not been trained to make, and then asked to arrive at a decision about the risk/benefit ratio of continuing the drug. The patient has contracted with the physician to do these things, and should not be asked to do them for himself. The primary purpose of the PPI should be patient education. It should not meet the "right to know" demands of consumer groups, for this can currently be met by giving any one who asks for it the official labeling currently in use. Nor should it be written to satisfy the bureaucratic legal talent within the FDA.

With respect to who should distribute the PPI, the physician, the pharmacist, or both could handle these documents.

One of my gravest concerns is whether the circulation of package inserts will benefit patient care. In theory, full understanding by patients is highly desirable. In practice, the public does little to protect or promote its own health and appears to ignore printed warnings and directions. Cigarette sales have increased in spite of the Surgeon General's warning. Seat belts in automobiles are frequently not used. Few people adhere to the 55-mile-an-hour speed limit. Public information on the hazards of obesity has not decreased the number of fat people in our society. Alcohol is the most dangerous and the most abused of all drugs, and this abuse occurs with the government's blessing since it generates tax revenues.

Historically there is not a shred of evidence that PPIs will serve any useful purpose, and they may be just one more burden to a society already staggering under an insupportable mass of bureaucratic red tape.

Patient Package Inserts-An Industry Viewpoint*

By S.O. WAIFE, M.D.†

Although there is no complete agreement within the pharmaceutical industry, in general one can say that the industry is anxious to participate in any action that will improve the quality of health care by enhancing the relationship between patient and physician.

However, at this time there is insufficient evidence to allow us either to support or to reject the concept that *written* patient information, supplied by the *manufacturer,* through the *physician* or *pharmacist,* is the best means of achieving this objective.

Just what is the objective?

1. Is it the "right to know" as a basic philosophic or moral issue? One opinion is that the "right to know" also involves the right to participate in decision-making. However, patients do not have the background to weigh the benefits against the risks (i.e., side effects). The right-to-know also requires the obligation to be appropriately informed, or to learn, or to understand — which touches on the ethical dilemma posed by the patient who refuses to take what the physician considers a necessary medication.

2. Is the objective "compliance" with directions? There is very little evidence that written directions significantly modify behavior (the classic example being the smoking warning on cigarette packages). There are already many hand-out publications and many discussions in the lay press and in other types of literature, without evidence that this is an effective course of action.

3. Is the objective "increased safety"? Some adverse reactions will develop because of the pharmacologic properties of the drug, regardless of any warnings. What is the evidence that early reporting of side effects, or better acceptance of some effects, will result from a published package insert?

4. Is the objective "better prescribing"? Some consumer groups have implied that the doctor would be more careful in prescribing if he knew the patient would receive a printed PPI. This opinion, it would seem, shows a basic hostility to the medical profession and the drug industry.

Among the unresolved problems — or why we need more thought in research and fewer FDA regulations — may be the following:

1. The hospitalized patient. In such a case noncompliance is not a problem, yet the patient also has the "right to know." The logistics, especially of multiple prescriptions for hospitalized patients, and the problems of bulk purchases by the hospital with literature distribution to individual patients, are of such magnitude that the industry feels these questions must be addressed and the solutions found before any regulations are promulgated.

2. Are there alternative methods? First, we should consider greater use of existing general warnings and of direction booklets now available. Both the AMA and the PMA have prepared well-planned and well-produced booklets telling the patient of the need to follow directions carefully and not to exchange medications, etc.

Secondly, a system has been suggested whereby a list of questions would be

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*Excerpted from a presentation at a Symposium on Patient Package Inserts, at the College of Physicians of Philadelphia, January 20, 1977.

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distributed to the patient by the physician. The patient would select those questions that are of particular relevance to him and would receive a personalized verbal response from the physician. Very often the patients do not know what questions to ask.

Thirdly, greater use of audio-visual materials (tapes and pictures) and other methods may be helpful in explanation. But do patients really need to be educated about the drugs, or the disease they have, or the basics of therapeutics generally?

Consumer groups have cited patient errors, including the transfer of drugs between patients, their forgetfulness, and misunderstandings, as reasons for the use of PPI's. In our opinion, transfers may actually be encouraged by the PPI. Furthermore, even present labeling on prescriptions is not always followed.

With regard to the problem of specific vs. "class" labeling, the industry generally prefers the individualized literature rather than class labeling. But the resulting volume and complexity would produce chaos unless the unit-of-use packaging concept comes into play. Furthermore, getting reviews by the FDA could delay new drug approvals.

If PPIs are to be developed for a particular therapeutic category, all the prescription drugs for that indication would have to be included and information on them developed at the same time. For example, if antihypertensive drugs are to be patient-labeled as a class, different pharmacologic classes of agents would need to be covered, and their literature would necessarily vary. Thus, the problem becomes more complex if class labeling is chosen instead of individual drug PPI's.

LEGAL LIABILITY

This is a very serious problem, and there are as yet no answers to such questions as: If the pharmacist is the distributor, what is the liability if he fails to give a PPI, or gives the wrong one, or an out-of-date one, or uses literature from Brand A with Drug B in those areas where he can substitute?

If the physician is the distributor, what liability is there if, in his judgment, it would be better not to give a written piece to a specific patient, or if he is out of stock? Is his obligation to federal regulations greater than his obligation to his patients?

LIABILITY FOR THE MANUFACTURER

In the current climate, complete disclosure may be required in spite of the potential danger of unnecessary fear, anxiety, and default by patients, for the manufacturer may be held liable if incomplete information concerning an adverse reaction is given to a patient, even if the drug has been manufactured properly and is prescribed properly.

Also left unexplored at the moment are the liabilities that would fall on physician, pharmacist, or manufacturer in the instance of inadequate up-dating of the PPI, or slow dissemination of a new warning for any reason.

COSTS

The industry sees greatly increased costs in the preparation of PPIs (time, printing, cost of paper, etc.); in their distribution, handling, and storage; in the physical facilities in the pharmacy or doctor's office; in the cost of attaching the literature; in record-keeping, and so on. If, as the USP Convention suggests, a dispensing pack (unit-of-use) is used, each with its factory-attached PPI, there would also be increased costs. These costs would be passed on to the consumer,

and the inevitable question is: Are they worth it?

TYPES OF LITERATURE

Another way of examining the matter is to recognize that there are two types of literature being considered. They have been called the "high-dose" and "low-dose" concepts.

The "high-dose" concept is based on the belief that the patients have a "right to know" and are involved in decision-making. In essence, they are to give informed consent. In such instances the language level is extremely important, since the literature must be understandable to all patients. All dangers must be cited and the literature would be based on class labeling. Logically, it would be given by the doctor before he writes the prescription, in the same way that he gives information before obtaining consent for a surgical procedure.

The "low-dose" concept is based on information that helps the patient know how to take a specific drug properly, including drug interactions. It tells him what to watch for. In this case the language level may be less important and the literature should be written to cover specific drugs, not classes. Logically, this type of information would be given by the pharmacist (or the manufacturer) at the time the drug is dispensed.

Now, it seems to me that those who believe in the high-dose concept are people we might call *centralists*. They are those who, in general, prefer things to be standardized, uniform, government-regulated, and with, hopefully, a no-risk, safety-first policy.

Those who prefer the low-dose concept, psychologically, are those who could be called *peripheralists*. They accept the flexible individualization of information; they would prefer doctor rather than government control; and they would prefer a policy that makes possible evaluation of benefit-to-risk ratios.

RECOMMENDATIONS

Some recommendations I would make to the Greater Philadelphia Committee are:

1. That they urge a delay in any regulations until careful clinical trials are run. These trials should be of a quality as good as drug studies, and they should be well-controlled and statistically valid. Criteria should be established for patient selection, and comparisons should be made between one or two kinds of literature and no literature at all, with appropriate feedback of evaluations. These trials should be performed by truly qualified observers, and the experiment should be worked out with such groups as the AMA, ACP, AAFP, and specialty societies.

2. That they recommend the inclusion of two or three different types of drugs in the trials, because conclusions drawn from one would not necessarily be applicable to others. There are such problems as chronic vs. short-term use, and hospitalized patients vs. outpatients. The settings in the experiments may need to be varied, as well as the educational and socio-economic class of patients, with different types of doctors and pharmacies involved. I believe the results drawn from one study will not necessarily be applicable to the universe.

3. That they carefully check the legal liability that would accrue, even in the experiment.

4. Finally, an answer is needed as to who would finance such a study and yet not control it.

If we are trying to reduce the incidence of adverse reactions and improve compliance, we would need to measure whether a PPI will accomplish these ends. How can we measure these factors and prove them statistically? I do not believe we have the expertise to answer these questions at this time.

If we are trying to fulfill the "right to know," we need to measure the benefit against

the risk, including the risk of not taking the drug. How can we prove that the benefit to an individual patient exceeds the potential risks?

Is the benefit worth the costs? What are the true costs and how can we measure the benefits?

Because of all these currently unanswerable questions, and because the concept of PPIs for prescription drugs so directly affects us all as physicians and patients, we must try to postpone any precipitous governmental action until we can begin to get some answers.

Patient Package Inserts — *United States Pharmacopeia* Proposal*

By WILLIAM M. HELLER, Ph.D.†*

I shall leave to the other speakers the discussion of the pros and cons, the enthusiasms and the reservations, the wise forecasts and the dire predictions on the merits and demerits of the Patient Package Insert (PPI) concept.

In these remarks I assume that somehow the PPI will come about. That is not an assumption lightly taken, because I believe that PPIs will have profound effects on the practices of physicians and pharmacists, especially pharmacists. Nevertheless, assuming that the PPI will somehow come about, the practical questions then are: Who is going to write them? Who is going to distribute them? Who is going to pay for them? Who is going to enforce the whole procedure?

Those practical questions gave rise to a proposal by the United States Pharmacopeial Convention, first presented publicly on March 5, 1976, in response to the FDA's *Federal Register* notice on Labeling of Prescription Drugs for Patients, published on November 7, 1975.

We believe the proposal provides a practical solution to practically all of the reservations expressed by the many different — and often conflicting — interests and groups that are concerned: the patient himself, the consumer groups who claim to represent him, and the government that claims to be protecting him; his physician who prescribed the medication, his pharmacist who dispensed it to him, and the manufacturer who made it. Appendix A is a resolution of the Convention's Board of Trustees concerning the content of the PPIs.

WHO IS GOING TO WRITE THE PPI?

We propose that the "medical draft" of a PPI be written by the expert panels of the USP Committee of Revision and that this draft be polished into the "patient draft" by a National Advisory Council on Patient Information. The National Advisory Council on Patient Information would number among its members psychologists, educators, and consumers, who would be especially alert to the lucidity of the text (so that words such as *lucidity* are not included); representatives of manufacturers and FDA officials, who would be concerned with the relationship to "full disclosure" labeling; and state officials and practitioners, who would be concerned with the distribution and use of the PPI in the practice of medicine and pharmacy.

One of the most consistent threads running through the comments on the PPI proposals is that viewpoints differ widely and that quite diverse groups must have the opportunity to participate in the organizational operation and to comment on the PPI text.

That is precisely why an organization such as USP is needed. But why USP specifically? Mainly because USP is *not* an organization which, like our scientific and professional societies, exists in order to protect and promote our scientific specialties or our professional vocations. Rather, USP is

*Presented at a Symposium on Patient Package Inserts, at the College of Physicians of Philadelphia, January 20, 1977.

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simply a vehicle, a carrier through which concerned persons in medicine and pharmacy can get a needed job done.

A vehicle, in pharmaceutical parlance, is the combination of excipients with which the active ingredient is compounded into the dosage form by which it is administered. The vehicle adds convenience, stability, palatability, and acceptance. If not properly designed, however, it can impair the availability and effectiveness of the active ingredient. In the case of PPIs, we believe that USP as an organizational vehicle could provide convenience and stability to the scientific/professional groups and palatability and acceptance to the consumer/professional groups, while not impairing availability and effectiveness from the consumer/governmental point of view. Medicine and pharmacy long ago recognized USP as their official vehicle, their official communications medium, and Congress declared it an official compendium when it passed the Food and Drug Laws.

The USP Convention exists and is organized to afford participation by, and comment by, all concerned. It does this now in the preparation of tests and standards for strength, quality, and purity, and in the wording of dispensing and other information about drugs that are in the *United States Pharmacopeia* and the *National Formulary*. Therefore, the working system for PPIs is already operative.

Participation is provided by the very nature of the USP Convention. The Convention is comprised of delegates from each college of medicine and pharmacy and from each state association of medicine and pharmacy; seventeen national organizations in medicine, pharmacy, the allied sciences, and the industry; and eight agencies of the federal government that are concerned with drugs. These members of the Convention elect the Committee of Revision that actually writes the official compendia. The seventy members of the Committee of Revision, all volunteers themselves, enlist additional volunteers to serve on advisory panels. In any five-year revision cycle, some 300 to 500 persons, therefore, serve formally as consultants to their colleagues. Because of the public service responsibilities it already carries out, USP has established rules and procedures to prevent domination by any single interest group, to handle potential conflict of interest situations, and to make information public.

There is a very important difference between getting a job done through USP and getting the same job done under government auspices. The USP operates under democratic principles. The votes of the elected members of the Committee of Revision are determinative; staff can only assist and coordinate. This arrangement is in contrast to the operation of a government agency where outside committees only advise and staff must make the final determinations.

The USP contrasts importantly also to any board- or commission-type organization that might be set up to handle PPIs. By necessity, a newly formed commission would be indebted to whatever organizations set it up. By necessity also, someone would have to provide the initial funding. In the drug business nowadays, this is most likely to be industry and/or government. Of course, those groups would establish its initial rules and regulations, appoint its first members, and probably even direct its constitution and bylaws. Those founding groups would be few in number and the commission itself would therefore likely have limited membership. It is unlikely that the commission itself would be set completely free of its founders, or even be in a position to enlarge its representation greatly and thereby dilute the influence and control of its founders.

USP, with its representation of both medicine and pharmacy, both national and state, both practice and science, both producer and regulator, provides

unparalleled opportunity for individual and organizational participation. The opportunity for all parties concerned to make specific comment on each phase of proposed text is also built into the USP proposal for PPIs.

Because of its existing responsibilities for revising the official compendia, USP has a well-developed system of publishing for comment all proposed new text and proposed changes of old text. The proposed text is published as early as possible, at the point the person or group responsible for the first draft sends it to the first review body.

In summary, one answer to this question of who is going to write the PPIs is that USP is proposing a two-step procedure, starting with a medically accurate and responsible draft which is then polished by a user-oriented group. Finally, the USP proposal presented to the FDA Hearing Clerk provides for FDA veto power at the end, if in FDA's judgment a PPI that has come through the first two stages is not acceptable as FDA-approved labeling for use by the drug's manufacturer.

WHO IS GOING TO DISTRIBUTE IT? ENFORCE IT?

Under the system proposed to the FDA by USP, the pharmacist is expected to be able to distribute PPIs printed by drug manufacturers in most instances, but the USP proposal also allows flexibility to private enterprise in the development of novel methods of presenting and distributing the stipulated text.

The unique value of having the PPI printed in an official compendium is that it can afford enforcement at either or both the state and national levels: (1) at the national level, the FDA enforces compendial requirements as directed in the Food, Drug, and Cosmetic Law — thus the manufacturer must use the PPI in the stipulated manner in labeling his package; (2) at the state level, the Board of Pharmacy enforces USP and NF requirements in governing the practice of pharmacy. State food and drug laws also usually encompass USP and NF; medical practice acts may do the same.

WHO IS GOING TO PAY FOR IT ALL?

Costs will be low, overall, because the USP system depends upon volunteers working in a nonprofit organization. Development costs would be borne by the USP Convention.

The costs to physicians and/or pharmacists and to manufacturers of physically handling the distribution of PPIs can vary greatly in amount and source, depending on the distribution systems used. That is why the USP proposal is intended to encourage flexibility. The initiatives of the American free enterprise system doubtless will come up with good and novel ideas that none of us envisions now. USP's contribution to this phase would be based on (1) putting the text into the official compendium so that it could be used as labeling by the drug manufacturer or other parties, and (2) distributing the compendium widely so that the text would be available in virtually every pharmacy.

In the final analysis it is the customer who pays; but at least with the voluntary system, he pays only as a customer and not as a taxpayer as well.

APPENDIX A

Resolution on Patient Package Inserts, United States Pharmacopeial Convention Board of Trustees, November 1, 1976.

WHEREAS the provision of information to patients about drugs prescribed for them has in the past been primarily by verbal consultation in the course of the professional practice of physicians and pharmacists, and

WHEREAS studies have shown that the provision of properly designed and worded written patient package inserts accompanying physician and pharmacist consultation can improve patient understanding and proper use of prescribed drugs, and

WHEREAS various state and federal statutes control the labeling of drugs, and

WHEREAS the provision of written information should take into account the legitimate concerns of the consumer-patient and the health professionals he/she depends upon for support and guidance, as well as the pharmaceutical manufacturers and governmental regulatory agencies, therefore be it

RESOLVED that the USP Convention, as a representative body of medical and pharmaceutical scientists and practitioners assigned drug standards-setting responsibilities by the Congress and by most State Legislatures, seek to develop, to supplement verbal consultation, selected patient package insert information that conveys a fair and helpful balance of the positive and negative aspects of the particular drug, with consideration being given to including such information as the following:

(1) the name and general usage of the drug;
(2) storage instructions;
(3) information designed to further the therapy selected by the physician and/or to assist and improve patient compliance;
(4) proper administration technique;
(5) warnings of hazards that might commonly occur and cautions to be observed with the use of the drug;
(6) selected patient-discernible side effects that should be brought to the attention of the physician, or that might cause undue alarm on the part of the patient or interfere with his/her normal activities; and
(7) advice that additional information is available on request to the prescriber or dispenser.

A Student's Impression of Austin Flint ("The American Laennec"), 1848-49*

By OLIVER P. JONES, Ph.D., M.D.†

Ninety years ago the College of Physicians of Philadelphia lost a member, Austin Flint, Sr., who was the acknowledged leader of American medicine at that time (Figure 1). The gap caused by his death was attested by the outpouring of obituaries both here and abroad. Various medical faculties, societies, and associations drafted and passed memorial resolutions. Biographical sketches, which began to appear in 1887, have continued to be published until the present. One of the first biographical sketches was written by another eminent member of the College, Dr. Jacob M. DaCosta. A recurrent theme in all of these writings is that Austin Flint, Sr., was a good teacher who influenced thousands of students during the years he taught at Chicago, Buffalo, Louisville, New Orleans, Long Island, and New York City.

Fig. 1. This photograph of Dr. Austin Flint, Sr. was taken between 1855 and 1859. He was between 43 and 47 years of age and was still at the University of Buffalo. (Courtesy of the Buffalo and Erie County Historical Society.)

To date, no old attics or letter files have disclosed diaries or notes made by students during Flint's lectures describing either the content of his lectures or the impressions he made on his listeners. However, let us consider that for about 350 years it was a matter of conjecture as to whether Andreas Vesalius could draw or delineate, until notes written by a medical student, Vitus Tritonius, about Vesalius's first Paduan dissection were discovered among the manuscripts in the National Library in Vienna. According to the medical historian Charles O'Malley, the diagrams which Vesalius used were fashioned after Galen and Guinter of Andernach and were used as demonstrations before he began his dissection. More important are the notes written by a German medical student, Baldasar Heseler, who attended Vesalius's demonstrations at Bologna in 1540. His notebook was found among the manuscripts in the Royal Library of Stockholm in 1846. There it remained until it was discovered and translated from Latin into Swedish by Ruben

*Read before the section on Medical History, The College of Physicians of Philadelphia, January 12, 1977.

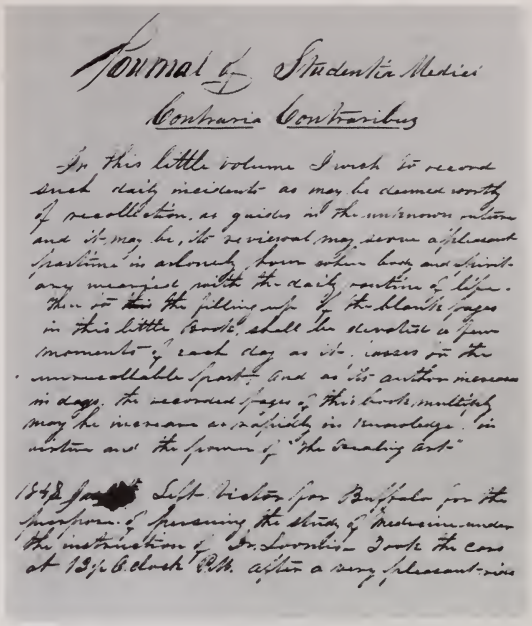
†Distinguished Professor Emeritus, School of Medicine, State University of New York at Buffalo, Buffalo, New York 14214.

Eriksson, who subsequently had it translated into English in 1959. The notebook verified many of Vesalius's own statements about his activities and methods.

Fortunately for those interested in Austin Flint, Sr., it was only 122 years after he began his lectures at the University of Buffalo that it was my privilege to read and analyze a diary or journal written by one of our students from 31 January 1848 to 18 April 1849. In addition to entries concerning his association with Flint, there are others relating his own experiences as Health Physician for the City of Buffalo during the cholera epidenic of 1852. The diary was among rare books owned by the late Dr. Elliott Hague, ophthalmologist and bibliophile. His son, Dr. Thomas Hague, who grew up with some of my children, knew of my interest in medical history, and lent me the notebook for my study.

The diary has hard covers with marbling, and a leather spine, and measures 6½ by 8 inches. The title page reads, *Journal of Studentia Medici Contraria Contraribus.* It is not until page 143 that the author identifies himself as J. D. Hill. He was an excellent penman but an erratic speller, even with respect to ordinary English words. Our Latinists believe Hill meant to write *Student* instead of *Studentia.* That is, "Physicians study contraries by their opposites," which may be a reflection of the allopathic reaction to homeopathy (Figure 2).

John Davidson Hill was born in Manchester, New York, on 29 April 1822. He was raised on a farm and at fifteen years of age was the sole manager of 500 acres of land. He left the farm when he was seventeen years old and entered Lima (New York) Seminary to seek an education and the wider walks of life. Afterwards, he studied medicine in the office of Dr. Dayton in Lima, and matriculated in 1847 at Geneva Medical College. Apparently Hill did not keep a diary at Geneva as he did at



Journal of Studentia Medici

Contraria Contraribus

In this little volume I wish to record such daily incidents as may be deemed worthy of recollection, as guides in the unknown future and it may be, its reviewal may serve a pleasant pastime in a lonely hour when body and spirit are wearied with the daily routine of life. Then to the filling up of the blank pages in this little Book, shall be devoted a few moments of each day as it passes to the unrecallable past; and as its author increases in days, the recorded pages of this book multiply may he increase as rapidly in knowledge, in virtue and the power of "The Healing Art..."

1848 Jan[illegible] Left Victor for Buffalo for the purpose of pursuing the study of Medicine under the instruction of Dr. Lovejoy. Took the cars at 12½ O'clock P.M. after a very pleasant visit

Fig. 2. First page of journal or diary kept by Dr. John D. Hill every day he was in attendance at the Medical Department of the University of Buffalo from 1848 until graduation in 1849.

Buffalo; he referred to his experience there in just a couple of sentences about his former professors.

The first entry in the diary is undated but was probably written at home in Victor, New York, before he left on 31 January 1848:

> In this little volume I wish to record such daily incidents as may be deemed worthy of recollection, as guides in the unknown future and it may be, its reviewal may serve a pleasant pastime in a lonely hour when body and spirit are wearied with the daily routine of life. Then to the filling up of the blank pages in this little Book, shall be devoted a few moments of each day as it passes to the unrecallable past; and as its author increases in days, the recorded pages of this book multiply may he increase as rapidly in knowledge, in virtue and the power of "The Healing Art..."

In view of our interests in the Bicentennial Year, I am going to start with the entry for 22 February 1848, which reads:

> Each return of the anniversary of the birthday of George Washington brings to mind the recollections of a great and a good man. The mind dwells with pleasure

> upon the memory of those "bright particular stars" that lighted our country through the perils of the Revolution and made it free. None in the galaxy shown out during the entire contest with such bright enduring effulgence as the character whose history commenced on the 22nd of February, 1731....

The entry for 28 March 1848 reads:

> Webster (Anatomist) lectured on the eye. Flint on acute and chronic laryngitis. The former of which the first recorded case was that of which George Washington died.

A year later (1849), Hill was so engrossed with clinical subjects that he did not have time to write so philosophically. However, it was coincidental that the entry for 22 February should read: "Dr. Flint gave us today what he had to say on laryngitis or inflammation of the larynx, or more properly the submucus tissue with the infiltration of *lymph* and *serum.* This is a most fatal disease and of recent origin, it is the disease of which Washington died. Treat.: Blood letting, emetics, cathartic, calomel — revulsions and tracheotomy...."

For forty years I have taught gross anatomy, among other subjects, and it is difficult to shed one's tools of the trade, so to speak. Hence, when it was my privilege to read and analyze this diary, my immediate reaction was to dissect it. This could be done systematically by cataloging the entries under such headings as weather, civic events, recreation, the medical school, and the faculty. It was done for the faculty by noting the number of favorable and unfavorable or derogatory remarks written by Hill about each of the eight individuals out of a total of 326 entries. In essence, some professors could do no wrong while others were not complimented for anything. Let us consider the entry for 24 March 1848, which is the first of three favorable comments about Flint:

> ...Attended Dr. Flint's lecture on auscultation and percussion. He had given one lecture which I missed. I think the Dr. very clear in his elucidation on this subject and for this reason seek his lectures.

Hill was scheduled to attend Flint's lectures during the second term of medical school, but Prof. James Webster, who commuted from Rochester, New York, did not arrive on time to give his lecture on anatomy on 3 April 1848; the entry for that day reads:

> Prof. Webster was absent today so I attended one of Dr. Flint's lectures on pleuritis. It was a very practical lecture. He recommended the students to read an article written by Dr. Stokes and published in Braithwaite's Retrospect 4, No. 2 on the same subject.

This reference was erroneous, but there is an article by James Hope on the treatment of chronic pleurisy with effusion which contains a paragraph on Stokes' mode of treatment with cold Lugol's iodine and mercurial ointment.

The third favorable entry was on 13 April 1849, just five days before graduation:

> ...Flint finished on scarletina, a very good lecture for him. He also made some appropriate remarks to the class on the retrospective and prospective and then bid us farewell....

The first two unfavorable entries follow:

> *10 February 1849*...Dr. Flint gave a clinic but did not amount to any particular sum and I do not deem it worthy of a synopsis on this page....
> *29 March 1849.* Bored with lectures all day. Flint gave two lectures on Typhus, and this has become stale enough and not finished yet....

Why was Hill bored all day with lectures, and why were Flint's lectures on typhus "stale"? There is really no clue in the diary — but there is one in the *Annual Announcement* of the Medical Department of the University of Buffalo for 1849. There we learn that Hill had selected *typhus* or *ship fever* as his thesis subject. Hence, much of what Flint had to say about the subject was very likely a restatement of information already known to Hill from other sources.

The final unfavorable entry was:

> *9 April 1849*...James Platt White continued his lingo on hysteria but it was neither *here* nor *there.* Flint was still on Smallpox — and small was his lecture....

This entry brings out Hill's wry sense of humor and sarcasm. Since Hill belittled the lecture and made a pun about it being "neither *here* nor *there,*" White very likely espoused the theory that the uterus in cases of sexual deprivation would rise up and wander through the body in search of moisture and humidity. The entry about Flint — "and small was his lecture" — was written in diminutive script. The entry for 13 April seems to have been made with tongue in cheek. Perhaps Flint was just as tired of giving lectures as Hill was of listening to them. (By the way, the medical course that year had been extended from sixteen to twenty weeks.) Whatever the reason, it is obvious that Hill's admiration and respect for Flint as a teacher had diminished between March 1848 and April 1849.

Rather than leave these entries on an unpleasant note, two more will be quoted to show that Hill could be quite objective when he felt so inclined. First, let us remember that this was only the fourth lecture course given by Flint; the first was at Rush Medical College. The entry for 21 March 1849, in which Flint challenges the students to contribute to and advance the knowledge of medicine, provides some indication of the great teacher he was destined to become:

> ...Flint took up remittent fever, gave the history, phenomena, some of the supposed causes and pathology. The latter, however, he concluded we know next to nothing and hoped the subject would meet with the attention from the present class if anyone located favorably, to receive an opportunity to investigate the subject....

Hill was the top man in his class when he graduated on 18 April 1849 (Figure 3). He records the events of that evening as follows:

> ...Prof. Flint had a levee at 9 o'clock this evening. It was quite pleasant so far as I was capable of judging....

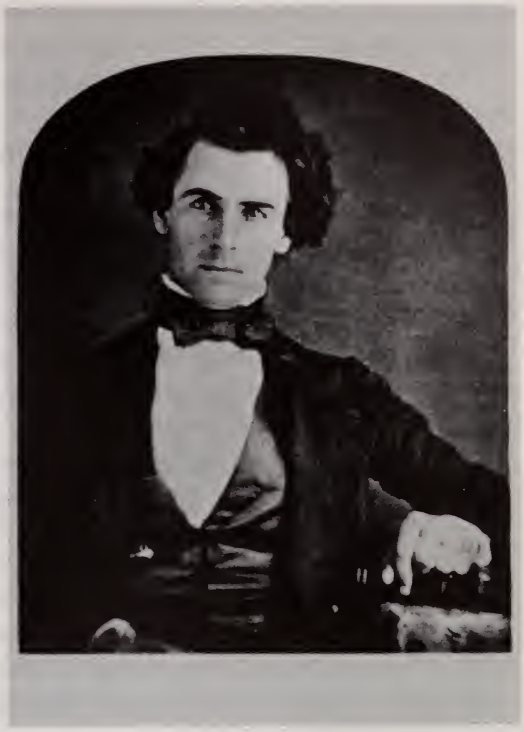


Fig. 3. A photograph of Dr. John D. Hill taken about the time of his graduation at the age of 27.

What about the subject of Flint's lectures and their sequence? From 24 to 30 January 1849 the sequence of five lectures was cholera, entozoa, peritonitis, hepatitis, and diseases affecting the nervous system. This raised the question as to whether Flint was following any particular textbook. Fortunately, it has been possible to assemble, from our Rare Book Collection, thirty-four of the textbooks recommended to the students for the 1848-49 lecture courses. In order to determine whether the subject sequence of a particular text was followed, a little literary detective work was undertaken. A table was constructed by noting the page numbers in the indices for the five topics and ranking the order of their appearances in four of the textbooks recommended to the students on medicine — by Hall, Dunglison, Watson, and Woods.

Flint did not publish the first edition of his *Practice of Medicine* until 1866, but the diary

suggests that he had an outline for it in mind as early as 1849. The identical sequence of lecture topics with that of Dunglison's textbook would indicate that he was not following the arrangements in Hall, Watson, or Woods.

However, when we consider that 35 pages about other diseases are between the first two topics in Dunglison, 383 pages between the third and fourth topics, and 138 between the last two topics, it is obvious that Flint was not adhering consecutively to that text either, but rather was arranging his own lecture notes which he later used as a basis for his famous *Practice of Medicine.* In both the first and sixth editions of this work the topics were treated in immediate sequence. Quite naturally many new subjects were added, but the general plan was the same as that which he used in his lectures thirty-seven years earlier. It should be noted that both authors had the same Philadelphia publisher.

In the first edition (1866), Flint wrote, "My first case of cholera illustrated...," but in the second edition (1867) he wrote, "My first case of cholera in 1849 illustrated...." In other words, even though he was in New York City at that time, he was still using records of cases which he had begun to collect at Buffalo in 1836. The case Flint referred to is very likely the one reported by Dr. Stephen Smith when he was a resident medical student and Flint was attending physician at the Sisters of Charity Hospital at Buffalo. Altogether, Flint saw eighty cases of epidemic cholera. He lectured about cholera on 23 January 1849, but he did not see his first case until June of that year. Flint, therefore, like the students, had to rely upon one or all of the available text books on the theory and practice of medicine.

No doubt there are many more cases from Buffalo in the seven editions of his book, but they are not so readily identifiable as those in the chapter on typhoid fever. In this chapter Flint referred to his article on epidemic fever, which occurred in 1843 at North Boston (eighteen miles from Buffalo), affecting twenty-eight persons of whom ten died. This was his first conspicuous success.

Up until the time of Flint's death in 1886, he had filled 16,922 folio pages of his recorded cases which he began to amass in 1833. After his death, the *Cincinnati Medical News* stated, "In every state and territory of this vast country the book that will be most likely to be found in the office of a medical man, whether in the city, town, village, or at some cross-roads, is Flint's Practice...."

Perhaps there is only one diary like John D. Hill's, but it is my pleasant thought that much memorabilia may still be preserved by neglect, in the dusty and forgotten corners of private and public buildings, and that the future will bring to them the attention that their importance deserves, considering the humanizing light they may cast on the greater or lesser figures of our medical past.

DISCUSSION

By THOMAS M. DURANT, M.D.*

Dr. Oliver Jones has given us a very interesting paper about Dr. Austin Flint, whose outstanding medical career spanned the greater part of the nineteenth century. He has raised the question, during his talk, as to whether or not Dr. Flint was indeed the great teacher described in the obituaries published at the time of his death in 1886, and revered by us in the medical world since then. Dr. Jones, question is based on the fact that only *one* set of student notes describing his lectures has so far been discovered and that that copy contains some comments that are not altogether laudatory.

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*Deceased. At the time of his death, Dr. Durant was Professor Emeritus of Medicine, Temple University School of Medicine, Philadelphia, Pa. 19140.

Personally, I have always thought highly of Dr. Flint, and I do not intend to change my opinion on the basis of the evidence presented here today. I own a copy of the last edition (1886) of his textbook of medicine. I find it well written and informative, considering the period in which it was produced. Admittedly, we cannot assume that because an author writes well he would also be able to speak or teach well. However, I am impressed by the fact that his paper on "The Analysis of Auscultatory Signs," presented in London, England, was received with acclaim, and that a paper on "The Pitch of the Percussion Note in Diagnosis" was awarded first prize at a meeting of The American Medical Association. I cannot believe that a poor teacher could have received such commendations.

Flint's textbook is a source of interest in other respects as well. Before reading it I had always wondered at what time in the development of medical therapeutic knowledge venesection had finally disappeared. In his text, Dr. Flint takes great pains to show that the removal of blood from a patient is not only of no value, but usually harmful as well. He is so emphatic in his damning of the method that we must conclude that it was in use by some physicians even at that late date.

Our knowledge of Dr. Flint's interest in pulmonary physical diagnosis suggests that his text would contain much of value on this subject. We are not disappointed. Students of today could learn much from it, since we so underemphasize for them the value of this aspect of diagnosis. Today the x-ray is considered all powerful, and some pulmonary specialists are known to pride themselves on not even carrying a stethoscope! I would not carry one either, if my knowledge of physical diagnosis were as sadly lacking as theirs is! The x-ray is indeed and indisputably an invaluable diagnostic aid, but there are numerous instances where the stethoscope is mightier than the roentgen tube.

We must remember that the era of microbiology was in its early stages of development in Flint's day — so early, in fact, that some physicians had not yet recognized the contagiousness of infectious diseases. Flint struck an important blow for something which we now accept without question. He had the opportunity to observe and to study an epidemic of typhoid fever in North Boston, a town just north of Buffalo. By an analysis of relevant data worthy of a Sherlock Holmes, he traced the source of the disease to a traveller who had lodged at the local inn, and by clear logic he showed that contagion was the only possible reason for the spread of the disease. The details of this interesting story are readily available to us in a paper written by Dr. George Thorne,[1] and I can highly recommend its reading to all physicians and medical students.

It is of interest, in passing, to note that Dr. Flint was one of a family in which there were five successive generations of physicians. I cannot help thinking that the joy realized in his life's work by each of the fathers in this succession must have influenced the son to follow his father's profession.

I conclude that Dr. Austin Flint was a medical polymath, in that he combined teaching ability, mental acuity, a keen sense of observation, and inexhaustible dedication to his work.

REFERENCE

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How Diseases Birth and Die*

By ROBERT P. HUDSON, M.D.†

In the table of contents of many nineteenth-century medical textbooks, the modern reader will find a host of diagnostic names which were daily working terms for his medical ancestors, but which are thoroughly mysterious even to medical initiates today. For example, it is unlikely that anything meaningful comes to the medical mind when confronted with such nineteenth-century diseases as anemia of the kidneys, or spinal irritation, or an entire family of fevers including pernicious, bilious, and febricula. Other terms such as lardaceous liver and ossification of the arteries, while no longer used, are recognizable as having modern counterparts. But many nineteenth-century names for diseases have not merely evolved; they have disappeared entirely. For these, one may ask, What were they? What happened to them? How did they come into being and why did they die?

Examining the birth and death of diseases can be intrinsically intriguing to medical historians and philosophers, a sort of scholarly who-done-it. What is perhaps less immediately apparent is that the study of the biography of diseases can have direct implications for those who teach, investigate, and practice in the health professions. This is true because many of the processes that operated in the birth and death of older diseases are still in force today. The concept of disease is a dynamic, human creation which is changing now just as it always has. Since our conception of a disease in part dictates our response, our actions, toward that disease, it becomes incumbent upon all health professionals to understand their personal role as accoucheurs and undertakers, unwitting or not, in the birth and death of conditions we currently label as disease.

A good way to begin this understanding is through the historical perspective. A backwards look can reveal a number of mechanisms underlying the natality and mortality of diseases. Understanding these mechanisms, in turn, can give useful insights into the evolution of disease as it proceeds around us presently, and to a lesser extent, perhaps, indicate ways in which health professionals can control their conceptions of disease, ways that will provide the greatest benefit for their patients and thus for society.

Before going further, it is necessary to confront a semantic problem. What do we mean by the death of disease? In the case of a viral disease, do we mean the total elimination from Earth of the potential pathogen or merely the disappearance of human illness in which that virus plays a major etiological role? The question is more than rhetorical. We have the theoretical capability through mass immunization to record a year completely free of smallpox. Would the disease then be dead, even though the virus might still exist in other presently unknown reservoirs?

There is help here in changing the question to — do *illnesses* birth and die? Tuberculosis is a useful theoretical construct by which we study the life processes of an organism and its effect on human tissue, but it is *au fond* an abstraction.[1] Tuberculosis, the disease, becomes a reality only when it involves a human being in that never-before, never-to-be-repeated episode we call an individual illness. So although the terms disease and illness will be used interchangeably here in deference to common usage, the reader will

*Samuel X Radbill Lecture II, Section on Medical History, The College of Physicians of Philadelphia, March 16, 1977.

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understand that what is meant is illness as just defined. It follows then that the persistence of smallpox virus in a presently unsuspected host would not mean that the human disease, smallpox, existed, if the virus no longer produced human illness. The importance of this distinction will be more apparent in what follows.

A number of students have written on the demise of individual diseases.[2] In the present essay it is taken as an axiom that diseases come and go, and the emphasis will be on categorizing causal forces in the hope that some understanding can be gained of the social and natural forces directing the origin and extinction of diseases.

ENVIRONMENTAL DISEASES

Because they are obvious to everyone, and because their mechanisms of birth and death are relatively straightforward, the first group to be considered is that of environmental diseases. In this instance, one need not resort to history: a number of environmental diseases have come into existence in our lifetime. Indeed it seems that scarcely a month goes by without a new birth announcement, though it is more difficult to identify environmental diseases whose demise is certain. Of the hundreds of possible examples we need mention only the insidious nativity between 1953 and 1960 of Minimata Disease, which resulted when a Japanese industrial plant dumped mercury into Minimata Bay. The mystery here was that records supplied by the plant managers indicated they had dumped nothing but inorganic mercury, which is far less toxic to man than organic forms. Scientists then made the truly terrifying discovery that the tons of inorganic mercury that had been dumped in the world's waters over the years did not always remain inorganic. Rather, some of the mercury could be converted into deadly methylmercury by bacteria which were consumed by plankton; the mercury then moved up the food chain and eventually reached humans.[3]

A subdivision of the environmental category is occupational diseases. These too have a long history dating, in a definitive sense, back to Bernardino Ramazzini's publication of *Diseases of Tradesmen* in 1700. In this group are found such veteran conditions as silicosis, berylliosis, bagassosis, and Black Lung, and such newcomers as hepatic angiosarcoma in workers handling vinyl chloride,[4] green-tobacco sickness among tobacco harvesters,[5] and respiratory illness in meat wrappers.[6]

The point about environmental and occupational diseases is that they are directly related to human activity. They are born when people begin engaging in certain activities, and they die when people cease those activities or take the precautions necessary to separate themselves from the offending agents. There are contributory environmental factors of purely natural origin, such as the solar radiation that increases skin cancer,[7] but these are all but negligible viewed in the context of environmental disease generally.

IATROGENIC DISEASES

A second large category embraces iatrogenic diseases. The term iatrogenic is usually used to mean physician-induced, but for our purposes it will be expanded to include diseases resulting from any application of medicine, whether by public health programs, individual physicians, or others purveying medical services, licensed or not. The mechanisms of birth and death in iatrogenic diseases are basically identical with those underlying environmental diseases. Iatrogenic diseases are born when patients contact new diagnostic or therapeutic

modalities, and die when the contact ends. The two categories are similar as well in that for each the birth rate presently far outstrips the death rate.

Iatrogenic conditions can best be viewed in two categories, disease and pseudo-disease. Real diseases under this heading include such well-known entities as penicillin anaphylaxis and encephalitis from smallpox vaccine. They now fill a book of some 925 pages aptly titled *Diseases of Medical Progress*,[8] and most of them are so well known even to lay persons that they need no further treatment here.

Iatrogenic pseudo-disease is used to denote the large and fascinating group of conditions that physicians and society over the years defined into and out of existence. Pseudo-disease is not to be confused with non-disease, the somewhat whimsical but still thoughtprovoking term elaborated by Meador in 1965. Meador informs us that "a non-disease may exist when a specific disease is suspected and when the suspected disease is not found."[9] As evidence he offered fifteen patients he had seen who were slightly obese, middle-aged, with round faces, ruddy complexions and prominent hair on the upper lip. All had come to him as possible cases of Cushing's disease, but laboratory tests ruled out this diagnosis. Meador argued that since these patients did not have Cushing's disease, they had to have Cushing's non-disease, and went on to say, "One might argue that this is ridiculous; the patient happened to have a combination of findings that represented normal variations so that Cushing's disease was only suspected. To the person unfamiliar with non-disease that is true, but not so for the serious student of health and its classification. Thus, a non-disease exists when a specific entity is suspected but not found. Students of disease only might then argue that *all* normal persons have non-Cushing's disease. Again this is not valid; not all normal persons are suspected of having Cushing's disease so how could they have non-Cushing's disease?"

Pseudo-diseases, on the other hand, are conditions which are diagnosed as such in their time, but which, for reasons such as improved diagnostic methods, are later abandoned. Historically, pseudo-diseases often have been associated with an organ whose function was not yet known, an organ, so to speak, in search of a disease. The list of deceased pseudo-diseases includes such conditions as status thymicolymphaticus, thymic asthma, Pende's syndrome or hyperfunction of the thymus, pineal myopathy, and catarrhal jaundice, propounded even by Osler and thought to be jaundice due to the swelling and obstruction of the terminal portion of the common duct. There was athlete's heart, ptomaine poisoning, essential gastrorrhagia or stomach bleeding (held to be a form of vicarious menstruation), and presbycardia or senile heart, which was advocated by William Dock and Tinsley Harrison but whose existence is now doubted by most. There are diseases whose existence presently is hotly debated. An example here is Buerger's disease, which was unquestionably a disease 20 years ago but is now the subject of some dispute.

Buerger's disease was first described in 1908 and had an unquestioned existence for 50 years. It occurred in men 20-45 years of age, mostly Jewish and almost all smokers. It caused changes in blood vessels which even the pathologists did not dispute. By 1960, however, Weissler and others published the conclusion that in the decade of the 1950s no patient had been admitted to Beth Israel Hospital in whom a diagnosis of Buerger's disease could be made with certainty. They recommended abandoning the term for diagnostic purposes. McCusick disputed this, but even those who argue that Buerger's Disease is a specific entity agree that its incidence is declining rapidly for unknown reasons.[10]

Nor must it be imagined that the results of diagnosing pseudo-disease were always inconsequential. Around the turn of the twentieth century a prominent surgical pseudo-disease was visceroptosis. In this condition, one or more of the viscera, usually the stomach, colon, liver or kidney, was held to produce symptoms because it had moved down from its proper anatomic location, hence the term visceroptosis. George Bernard Shaw parodied such surgery in the *Doctor's Dilemma*, wherein he had surgeons getting rich by removing a mysterious nuciform sac, which anatomists, for some reason, were unable to find, though it was easily visible to the trained surgical eye. The late Logan Clendening challenged the famous British advocate of the surgical correction of visceroptosis, Sir Arbuthnot Lane, as follows: "The modern membranic surgeon goes to his Donnybrook fair every day: 'If you see anything inside the abdomen, do something. If it is tight make it loose, if it is loose, make it tight, untie the organs, let them float, or else on Mondays and Wednesdays and Fridays let us sew them all up to the abdominal parietes.'"[11]

Sir Arbuthnot had noted that "an incapacity to perform any mental exercise is a common feature of [intestinal stasis]." Clendening wondered, somewhat irreverently, "Has he had his own colon removed may we ask?"

CULTURAL DISEASES

Another category of diseases that birth and die is cultural diseases. Examples of how the way in which we live influences our diseases come quickly to mind — cirrhosis from alcohol, lung cancer and emphysema from cigarettes, trichinosis from undercooked pork and beef, tularemia or rabbit fever from handling infected meat, and hookworm from going barefooted, to mention a few.

Perhaps there is no more dramatic and discrete example of a cultural disease than kuru, the deadly central nervous system disease found only in the Fore people of eastern New Guinea. For years scientists puzzled over this malady, and particularly its predilection for women and children. It is now believed that the disease is produced by a slow-acting virus, and that it is transmitted by the ritualistic cannibalization of their close kin practised by this tribe. The reason men are relatively unaffected is that they take part less often in the ritual and when they do, they rarely partake of the brain or spinal cord. Presumably this too is a disease that could die within a generation or two from nothing more than a shift in tribal customs. But if history is any guide, optimism concerning cultural disease should be guarded. Alcoholic cirrhosis could disappear from a similar cultural shift to total abstinence in our own society, but even the Women's Christian Temperance Union sounds a bit wistful in its periodic plea for a non-fermentative millennium.

A particularly fine example of cultural pseudo-disease is the condition known as masturbatory insanity. In the eighteenth century, largely because of the writings of Tissot, masturbation was linked causally to a host of mental disorders. From this jumbled conglomerate, medical people gradually came to believe that masturbation produced a specific form of insanity.[12] The heavy hand of religion in medical beliefs is obvious in this chapter of the story, though physicians were undoubtedly influenced by observing what they took to be excessive masturbation among asylum inmates. In any event, few physicians of the late nineteenth century doubted the existence of masturbatory insanity. The "masturbatory personality" was clearly spelled out in Tuke's *Dictionary of Psychological Medicine:*

> The face becomes pale and pasty, and the eye lustreless. The man loses all spontaneity and cheerfulness, all manliness and self-reliance. He cannot look you in the face because he is haunted by the consciousness of a dirty secret which he must always conceal.... He shuns society, has no intimate friends, does not dare to marry... [Later he] becomes a liar, a coward and a sneak.... [and finally] he sinks into melancholic dementia, relieved only by occasional excitement due to a temporary revival of his jaded passions.[13]

Hundreds, perhaps thousands, of these young persons were committed to insane asylums.[14] Attempts at cure included such heroics as cantharides, clitoridectomy, castration and placing a silver ring through the prepuce, the latter practice being abandoned when, in the words of its originator, "in their efforts to continue the vile practice [the ring was] torn out."[15]

Again, merely because we no longer recognize masturbatory insanity we may not say that the condition never existed. On the contrary its certain existence in the nineteenth century is simply a reaffirmation of the fact that disease has no absolute reality, that only illness exists.

NATURAL LIFE CYCLES

All the diseases so far described as birthing and dying have been related to human activity, either directly or indirectly. They resulted from cultural practices or occupations, from what physicians were doing, or from a social and medical consensus of sorts that simply defined the disease into existence and out again. It remains to ask, do diseases die *naturally,* which is to say, totally outside human activities? In truth the question is difficult to phrase in meaningful terms, because it is ultimately impossible to be certain that human activity did not influence the birth or death of a given disease in ways that were not perceived at the time and cannot be reconstructed historically. The terrible sweeps of bubonic plague during and after the fourteenth century would appear to be a new invasion of foreign bacteria into a susceptible population, and otherwise unrelated to human activity. We know, however, that these outbreaks depended on housing practices and crowded conditions that were hospitable to *Rattus rattus,* the flea-bearing houserat, in which an epizootic is necessary to sustain a large outbreak of the plague. To this extent, at least, the great sweeps of the Black Death were related to human activities.

A more modern, though still tenuous, example is the dramatic absolute decline of carcinoma of the stomach in the United States. Forty years ago this tumor was the leading cause of cancer mortality in males in this country; today it is the fifth leading cause among men and eighth in women.[16] There is evidence that this decline may be due to chemical antioxidant preservatives added to breakfast cereals, notably BHT and BHA.[17] If this relationship is proved, it will demonstrate that human beings by their actions can unwittingly alter their disease patterns in ways that contemporaries would have attributed to purely natural changes.

So it may not be tenable to speak of historical diseases that were born and died completely apart from the actions of human beings who had the disease. It may not be tenable, but it is fascinating to try. According to Zinsser, for example, there is no good evidence of epidemic poliomyelitis before 1840, and no reliable evidence of encephalitis before the eighteenth century.[18] It can be argued, of course, that these diseases have always been with us, but without the constellation of conditions necessary to produce an epidemic. Still their symptoms are so distinctive — the permanent wasting paralysis of polio and the prolonged coma in encephalitis — that it is risky to argue that the diseases existed even endemically and were not recognized by such astute clinicians as Sydenham, Corvisart, and Laennec. But once

again cultural factors cannot be safely overlooked. Poliomyelitis may have been ubiquitous but limited to the very young who might have been spared the paralysis and death. Later, with increasing affluence, young people might have been spared the milder disease of infancy only to suffer the severe form as young adults.

THE SWEATING SICKNESS

Historically, a consideration of the question of a natural life cycle for diseases leads one sooner or later to the sweating sickness or English Sweate of the fifteenth and sixteenth centuries. While no comrehensive historical treatment of this condition is possible here, the Sweate is useful in this regard for at least two reasons. First, it came and went in five great epidemics within a mere 66 years, and second, its symptoms were so distinctive that contemporary observers were confident they could diagnose it accurately and date precisely each of its fatal appearances.[19] Although there are disputes about the dates of the second and third epidemics, all observers, then and now, agree that the sweating sickness struck England first in 1485 and departed forever after the epidemic that began in 1551. If this is true, then clearly the sweating sickness represents a category of diseases that began and ended apparently outside any human interventions. But is it true?

There were a number of features that combined to make the English Sweate quite unlike any then-known epidemic disease. Outstanding among these was its tremendous lethality and remarkably short duration. We do not have accurate mortality figures for this period, but there is no doubt that the sweating sickness was lethal. Holinshed, the English chronicler who lived through one or more of the epidemics, said that "scarce one amongst an hundred that sickened did escape with life...."[20] This is undoubtedly exaggerated, but other evidence leaves no doubt that the Sweate was fearful. For example, at various times major feast days were cancelled, Oxford University closed down, and the Coronation of Henry VII was postponed. Not even love could overcome the pervasive panic that followed the Sweate. Henry VIII, who was pursuing Ann Boleyn during the 1528 epidemic, had his ardor chilled precipitately when he learned that Ann's chambermaid was stricken with the Sweate. Henry fled immediately on the first of several flights to avoid the epidemic. This and much other evidence attests to the lethality of the disease.

As for its other striking clinical feature, many commentators agreed that the Sweate lasted only 24 hours. The outstanding symptoms and signs agreed to by most observers were the sudden onset, without prodromata, of a shaking chill, high fever, soaking foul-smelling sweats that might demand 20-30 bed changes a night, terrible weakness, headache, palpitation, chest and upper abdominal pain, and finally brain involvement with delirium, coma and death. All of this might transpire in 24 hours or less.[21]

There were a number of other distinctive features that must be reconciled before we can hope to pin a modern name on the sweating sickness. The disease struck the young and robust more than infants and the aged, groups that we would expect to see die in large numbers had the disease been a particularly virulent form of influenza as some have postulated.

Further, in only one of the five epidemics was the mortality great among the poor. In the other four sweeps the disease was noted as far worse among the wealthy and influential.[22]

Third, it came back in waves weeks after the initial spread, suggesting that an attack conferred no immunity, not even a temporary variety.[23] This same phenomenon was

frequently described in influenza epidemics before we learned that the apparent recurrences actually were pneumonia secondary to the influenza itself.

Finally we come to the biggest obstacle of all. For two important reasons the pattern of spread was more like that of an insect vector disease than that of person to person contagion. First, the epidemics usually broke out as warm weather came and ended in fall or early winter. Second, the pattern followed that of yellow fever or typhus, not that of smallpox or influenza. Only one person in a home might contract the sweating sickness, or only one home in a block. This is a particularly annoying observation for those who later pointed to the many similarities between sweating sickness and a virulent form of influenza.

The virulence of the sweating sickness simply does not square with any known infectious disease. Only meningitis and poliomyelitis kill with such rapidity and then only rarely. On the basis of this alone we are tempted to conclude that the sweating sickness was a new disease in a susceptible population. This phenomenon is well known in the history of disease. It was exemplified only a decade after the first sweating sickness epidemic when syphilis either first appeared in Europe or assumed a much greater virulence than before. That disease too carried early mortality quite unlike the syphilis we know today. It is the phenomenon often seen when an infectious disease is introduced into a population having no previous exposure to it. This feature would square with the generally accepted view that the sweating sickness came to England with the two thousand mercenaries Henry brought with him from France and led to victory at the battle of Bosworth Field. But this leaves unanswered the question of how France for many years could harbor an endemic disease to which Englishmen were terribly susceptible, considering the large social, commercial and military intercourse between the two nations over the years.

The disease most often advanced as a possible modern equivalent to the English Sweate is influenza, and it is an attractive possibility. Against this thesis is the absence of prominent catarrhal symptoms, the sporadic skip-about mode of spread already mentioned, and the limitations except in 1528-29, to England, which is quite unlike influenza pandemics of modern times.

A second possible culprit is the spirochetal disease known as relapsing fever, which is transmitted to man by ticks and lice. Only the louse form is capable of producing epidemics. Man gets the disease probably not from the bite, but from crushing the louse on the skin, a perfectly understandable human reaction to the parasite. In 1916 Gerster championed the position that relapsing fever and the English Sweate were identical.[24] He has not been supported in his contention, which is strange, because nothing we have learned about relapsing fever since 1916 has materially weakened his case.

The clinical course of relapsing fever and that of the sweating sickness match reasonably well. Relapsing fever has an insect vector, as appeared to be case with the Sweate. The principal difference is the rapid high mortality of the Sweate, but this, as we have seen, differentiates the Sweate from all known contagious diseases.

If the English Sweate was relapsing fever in a highly susceptible population, it calls syphilis immediately to mind. With syphilis we have another spirochetal disease erupting in epidemic form for the first time in Europe only ten years after the first outbreak of sweating sickness. Whether there is any cross immunity between the spirochetes of syphilis and relapsing fever is uncertain, though we know that about twenty percent of victims of relapsing fever do develop a positive

serological test for syphilis. This could be important. It might, for example, figure into a population immunity that could help explain the final riddle of the English Sweate — what happened to it after the epidemic of 1551?

Referring to the 1517 epidemic of sweating sickness, Hecker wrote over a century ago that "...in this instance, too, inquiry the most circumspect does not penetrate through the thick veil which envelopes the inscrutable causes of epidemics." His words could safely stand today, even if extended to all five outbreaks of the Sweate. Assigning an unequivocal modern diagnostic term to the sweating sickness remains impossible. Contemporary medical men simply were not the meticulous clinical observers physicians would later become. Even their descriptive words have subtle nuances that elude us 500 years later. In past historical writings the term sweating sickness is almost always preceded by the adjective *mysterious*. So it must remain, at least for now.

Still, a total pessimism is not called for. History, it has been said, purifies itself like running water, a fact our temporal arrogance at times leads us to forget. One striking feature of the sweating sickness has not, to my knowledge, been discussed before. That is the remarkable periodicity of the five known epidemics. As noted, there are variations of one year involving the second and third outbreaks, depending on whose dates are accepted. The most commonly used dates are 1485, 1507, 1517, 1528, and 1551. The epidemics thus were separated by intervals of 22, 10, 11, and 23 years, which is to say by something close to 11 years or multiples thereof. If Zinsser's dates are used, i.e., 1485, 1507, 1518, 1529, and 1551, the 11-22 year cycles fit precisely.

One need not revert to astrology to wonder about possible cosmic influences in an otherwise remarkable coincidence. The study of cosmic and meteorologic influences on human disease is only in its infancy, but it is being pursued by serious scientists. There is evidence, for instance, that human fertility is more related to meteorologic conditions than to cultural factors.[25] To flirt with science fiction, a liaison scientists have found vastly rewarding at times, one might point out that sunspots peak in eleven year cycles, during which the amount of cosmic radiation reaching the Earth's atmosphere varies greatly. In this regard it might be recalled that the most serious recent pandemics of influenza occured in 1946, 1957, 1968, also intervals of 11 years. How sunspots might alter meteorologic factors, or human immunity, or microbial mutations in ways that contribute to periodicity in eruptions of epidemic diseases must be left to further running of the historical river. It is, however, brought up in complete seriousness. The fact that we get further away in time from the epidemics of sweating sickness is in itself no reason to despair of a final solution to the conundrum. Advances in our understanding of diseases generally may one day give us far more secure grounds on which to decide: was the sweating sickness an example of a disease that died and, if so, was the death permanent, or do diseases indulge as well in something akin to reincarnation?

A MODERN EXAMPLE

Before leaving the question of how diseases birth and die, the recent outbreak of so-called Legionnaire's Disease deserves a brief visit. For the historian of disease this outbreak was scarcely noteworthy in terms of numbers, yet it provided a number of insights of genuine value. Though it may appear tasteless to make immediate capital of an outbreak that produced 180 victims and 29 deaths, it is a graver offense to ignore whatever messages such occurrences have to offer.

The small epidemic of Legionnaire's disease has the paradoxical effect of destroying our confidence in our ability to identify the causes of older outbreaks of disease, and at the same time comforting us in our ignorance. Its sudden appearance and disappearance force us to accept the possibility at least that the English Sweate was indeed a disease entity that once did but no longer does exist.

There is further significance for historians of disease in an epidemic whose method of spread remains unsolved, in a nation whose scientific wherewithal for understanding all aspects of agents in epidemic diseases is as good as any in the world. In the face of our vast array of knowledge and technology, something important happens to our confidence in science and the protective mantle of preventive medicine when most of the important questions cannot be answered.

A fact that has received little notice is that the Legionnaire's episode was by no means unique in recent United States history. The Communicable Disease Center has files on some dozen outbreaks, each erupting mysteriously, striking down varying numbers of victims, and disappearing as darkly as it came.[26] Lacking the drama of Legionnaire's Disease, these small epidemics were not widely reported outside medical literature. But their message is the same.

Not only should such unsolved epidemics render us more forgiving of our medical ancestors and their attempts at sorting out and dealing with diseases, but they should make us more wary of the names they used and of our ability to solve such puzzles with nothing more than the rational process and the medical knowledge that has accumulated since Henry and his troops apparently first brought the Sweate to England in 1485.

Comfort derives from our failure, because Legionnaire's Disease shows us how complex the development and spread of a new disease can be. In searching for a final understanding of a given episode of historical disease, it becomes clear that we must consider the importance of factors other than a single guilty microorganism. Even if the current bacterial culprit holds up as the cause of Legionnaire's Disease, it will not explain the many puzzling aspects of the way the disease spread, of who was stricken and why others, apparently equally exposed, were spared. Disease experts and historians of disease need not be humiliated by the circumstances surrounding the Legionnaire's Disease, but it is altogether proper that they be humbled.

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Disease in History: Commentary On the Second Annual Samuel X Radbill Lecture

By RUSSELL C. MAULITZ, M.D., Ph.D.*

The history of disease has been a traditionally fertile domain of scholarly inquiry, a notion that Dr. Hudson has further corroborated here tonight. Part of the peculiarly compelling quality of this area of medical history relates, I think, to the fact that it links the interests of diverse disciplines and audiences who ordinarily spend little time actively engaged in intellectual discourse. The study of disease in history, especially when the tools of the demographer and those of the historical epidemiologist are brought to bear, brings insight to the interface of general social history and medical history.[1] When the tools of the paleopathologist are applied, the physical anthropologist, social historian and physician similarly find an intellectual commons.[2] And the history of disease, as viewed tonight by our speaker, illumines those concerns which grow up at the interface of historical medicine and contemporary medicine.

Dr. Hudson has delivered himself this evening of an essay on the natural history of disease. What it is an essay "in," however, and I believe quite appropriately, is the cultural anthropology of illness and disease. Here is where attention to the historical dimension — as Dr. Hudson has told us on this and many previous occasions — becomes invaluable. By adopting the posture of the historical ethnographer of health and disease, one may arrive at a sort of ecological sense of disease as process. The stress is then on man's ills and his perceptions of them, both undergoing change in response to external, global change, as populations of mice and men migrate, industrialize, and spawn their own "new" diseases.[3]

I should like to repond briefly to what I consider to be the strengths of this approach as well as to some of its potential pitfalls. I shall try to be as concrete as I can by using some of Dr. Hudson's cases-in-point and perhaps one or two examples of my own. First, consider the point raised tonight about the perennial (and I think largely needless) confusion between illness and disease in history. Though this is in part a linguistic confusion as our speaker suggested, it is a thick, semantic confusion rather than a thin, purely definitional one. In a given time, place, or susceptible population, does a "disease" become an illness when symptoms supervene? When so-called "cultural unmasking" occurs (as in certain constructions of hysteria or even asthma)?[4] When herd immunity flags, as in the current recrudescence of measles? What *is* "disease"?

Depending on their institutional or social location, medical theoreticians in answering this question have further clouded the issue by committing the ontologic fallacy: identifying the disease with the invading spirit or organism.[5] It is no surprise therefore, that for layman and physician alike, the notion of "illness" ends up being much less problematic than that of "disease." The behavioral and cultural correlates of the one are explicit and commonsensical, while in the other — "disease" — they are implicit and buried in the deep structure of the concept.

I hesitate to take this line of reasoning much further, since Dr. Hudson has said it

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already in regard to the case of tuberculosis: disease becomes an abstraction by which the human intellect seeks to grasp the common substrate beneath the varied expressions of "disease" as illness. To reiterate perhaps almost to the point of tedium, what history does is underscore the complexity of these substrates: biological, behavioral, socio-cultural and even perceptual layers are there to be peeled away one by one.

Dr. Hudson's paper performs this task of peeling away the layers with considerable skill. He is a more than creditable, and quite stylish ecdysiast. His ecological view of the history of disease is commodious — perhaps even more than he is willing to admit — in accommodating the various groups of diseases which he considers seriatim. The environmental diseases, appropriately, serve as his first and most straightforward example. Agents to which man falls prey willy-nilly (schistosomes or the sun's actinic rays), or agents which he himself elaborates into his environment (kepone or saccharine) envelop him like a chrysalis. And even those environmental agents which man did not actually create have historically been pathogenic in a manner which is culturally mediated: clearly changing styles of dress and behavior influenced exposure not only to the rays of the sun but perhaps also to the treponeme of syphilis. In the same vein, the damming of the Nile has had a striking effect on the incidence of schistosomiasis in very recent years.

Economic culture can negatively affect health. So, too, can both the high culture and low culture of common social mores. Here gout serves as a particularly useful example. In the eighteenth century, as recent historical investigations have demonstrated, gout was epidemic among the socially elite. It appears that this state of affairs resulted in part from the upper classes' penchant for drinking large draughts of fortified wine from earthenware vessels. Unfortunately for them and their big toes, the acidic wine leached the lead out of the glazes of these vessels, leading to the lead nephropathy of so-called saturnine gout. Then the epidemic of gout disappeared, only to re-emerge in the twentieth century when Alabama moonshiners began distilling their wares in lead-soldered automobile radiators.[6] Perhaps old diseases never die, but lie, like Rip Van Winkle, in wait for the right cultural conditions to reoccur.

It is an old chestnut in medical history that one of the earliest recognized environmental diseases was also an early example of the association between a neoplastic process and a man-made environmental carcinogen. I refer of course to Percival Pott's 1775 description of scrotal cancer in chimney sweeps. The history of cancer and cancer theory is dotted with considerations of the special and fearsome nature of this group of diseases, the "invaders from within." Yet I think they, too, will fall into the ecological, environmental framework erected this evening. Paleopathologists and epidemiologists are constantly adducing new evidence to this end: cancer is a disease of our polluted modernity.[7]

In a real sense iatrogenic disease also falls under this rubric of man manipulating, or at least mediating, his own constellations of ills. Medical historians are beginning to look beyond the physician's hieratic or priestly social function and see him rather as one enmeshed in a variety of larger systems of belief.[8] Indeed, the medical man or woman can often serve in historical analysis as a sort of litmus, or mirror, to society. Iatrogenic disease becomes another societal product in the manner of the asbestosis of pipefitters or the anthracosilicosis of miners.

Iatrogenic "pseudo-disease," to take Dr. Hudson's term, presents a bit more of a problem. The distinction which he maintains between diseases and "pseudo-diseases" in

history threatens to stretch his explanatory scheme out of shape. That is, here the scheme is clever to a fault — almost. I say almost because he stops just short of making his claim an ahistorical one. Take the condition once called "soldier's heart" as an illustration of what I mean. I am not certain if this was the same entity as the "athlete's heart" mentioned by our speaker, but all the same it went through a whole series of incarnations — irritable heart, DaCosta's syndrome, neurocirculatory asthenia, and so on — between 1871 and the present. Then, in the post-World War II period, two things happened. Technological culture made available the phono- and echo-cardiographic equipment which registered the funny clicks and the ballooning heart valves that now became part and parcel of the syndrome. At the same time the culture of bedside medicine assembled the long case series of such patients who displayed various odd heart murmurs. Hence the "soldier's heart" of World War I became Barlow's "click-murmur" syndrome of mitral valve prolapse — for now, anyway.[9] Which of these entities is the disease and which the pseudo-disease? The distinctions begin to blur. Although I remain uncomfortable with the *concept* of pseudo-disease to describe even the more fanciful diagnoses of old (e.g. visceroptosis), I must say again that Dr. Hudson has stopped short of abusing it: he has provided the appropriate disclaimer in insisting that the distinction is a heuristic more than a historical one.

There is relatively little I will want to say with respect to the intriguing example of the English Sweate. Retrospective diagnosis is diverting (in both senses of the word) and hazardous in the best of circumstances. The purpose of seeking an understanding of the concatenation of forces which influence the "life cycle" of diseases is not to facilitate such retrodiction, but precisely rather to explain why it is so devilishly difficult. We are dealing surely in every case with a vastly more complex set of questions than, for example, that of the mutability of a pathogenic organism in explaining the mutability of an infectious disease. Legionnaire's disease is indeed a splendid corroboration of this idea of a multiply webbed and complexly changing skein of events in the embrace of civilization and disease. When I lecture undergraduates on the approach to diseases like typhoid and cholera before the germ theory of disease supervened in the 1870s and '80s, I remind them of the humility impelled upon us by our etiologic (and hence therapeutic) ignorance in the case of the Legionnaires.

And that brings us full circle, for this is the note on which this evening's lecturer also took leave. Our prospect of disease past and present is most rewarding when it reminds us of the fragility of our own collective experience and the nature of our efforts, as a continuing process, to preserve it through history and through medicine.

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The Medical Therapy of Powwowing: Early History in Europe to Surviving Practices in Modern America*

By ELMER L. SMITH, Ph.D.†

In the Old World and among primitive people today, disease and death were and are often thought to be caused by evil spirits. Man feared the "evil eye" and considered witches and wizards to be living representatives of the devil and darkness. As a result, man took whatever precautions were available: he used amulets, thinking they were capable of thwarting the evil forces, or he turned to selected individuals who were assumed to have special powers that could counteract the evil forces. As Jules Michelet notes in his classic study of medieval supersitition, "For a thousand years the people had one healer; and only one — the sorceress."[1]

The present discussion concerns occult folk healing in which forms of conjuring such as incantations, amulets, ritualistic motions, gestures, and charms are used. This healing art has been called *powwowing* by the American Indians and *braucha* by the Pennsylvania Germans.

Generally, folk healing procedures have become complex as a result of the diffusion of several sets of beliefs and ideas into the original concepts at various times, all of which have merged into one set of procedures and practices. At the present there may be powwowing and conjuring inextricably intertwined with herb and plant healing, moon and Zodiac lore, and obsolete professional medical procedures (such as bleeding, sweating, and cupping), all of them being offered as part of the "helping" process by a local folk healer in a given geographic region.

Nearly three decades ago I had my first personal experience with occult folk practices in Pennsylvania. During the past two decades I have had direct personal contact with powwowers and other folk healers in West Virginia, Virginia, Maryland, and North Carolina, where many of the old-time practices persist among the older generations in isolated and mountainous regions. Many similar beliefs were once virtually universal in ethnic groups and among agrarian peoples in Europe and America. Today these beliefs and practices represent *sub rosa* survivals and are a part of the folk culture seldom discussed openly or in public.

Although occult hearing pertains to the supernatural, there are various levels or degrees of involvement among the practitioners. In almost every neighborhood there are individuals who are thought to have special powers to heal certain afflictions, the most common being warts, burns, and bleeding. Secondly, there are those who are general practitioners who "treat" a wide range of ailments including asthma, croup, sprains, erysipelas,, whooping cough, jaundice, and even stuttering. Thirdly, there are those who are referred to as "witch doctors" because it is believed that they have the power to counter the spell or curse placed by a witch or evil spirit.

The focus in this presentation is on witch doctors who practice white magic, seeking to help those afflicted by hexerei. Unlike the first two categories of practitioners, those who are

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considered to be witch doctors are usually viewed with some uneasiness or fear and are often held in awe by members of the community, just as the shaman is among primitive peoples.

In neighborhoods where the occult healing practices persist, other early folk beliefs are also present. For example, because man has had to struggle for subsistence, many uperstitions developed about food, and magical practices emerged to assure success in planting and preparing food. At regular intervals of the year, certain foods acquired magical qualities and were eaten to renew health or to assure well-being in the future.[2]

The folk included in this study seek to perpetuate the early self-sufficiency economy by hunting to supplement food for the table and by gathering edible greens; they make their own soap, apple-butter and maple syrup, and do their own butchering. They preserve home-grown foods in traditional ways. They are often without running water, inside toilet facilities, electricity, or the specialized services such as fire, police and public health protection. They usually plant by the moon and Zodiac, believe in signs and omens, and follow the traditions handed down from generation to generation. Their world-view is localized, and they are basically individualistic and fatalistic.

Folk treatments for all the common ailments are known in a variety of forms. Those presented here are primarily restricted to the occult type, with the occasional inclusion of an admixture when other types are inextricably intertwined.

WHOOPING COUGH

Whooping cough was a common ailment with a variety of occult cures and preventives, ranging from swallowing a live minnow to passing the child around a raspberry bush.

In 1888, a rural Pennsylvanian recounted: ". . . well do I remember the family tradition, that a trout had been taken from a spring and allowed to breathe three times into the mouth of my older brothers in the belief it would prevent whooping cough."[3] In the Appalachians and among the German element in the Shenandoah Valley, this same procedure was used to treat *thrash* or "sore inside the mouth" (Moniliasis).

The horse once played a major role in whooping cough treatments. It was claimed that the breath of a stallion would cure the cough. A horse's sneeze in a child's face would reduce a cough. The milk from a mare with a colt was used as a preventive or to reduce the cough if it had already developed. Hundreds of children were passed through a horse collar to reduce the cough. A granny-woman (another name for the female pow-wower) has directed: "Take the collar off the horse and place the child through it while it is still warm. Repeat it three times."[4]

The gristmill was also used for whooping cough. This writer has discussed the gristmill practice in regard to whooping cough prevention with more than twenty persons who used one of six mills.[5] The operator of the South Fork, Virginia, mill told how a man with four children came to his mill for treatment: ". . . he took the two babies into the hopper and put them in, one at a time, until the grain went through." He added, "Lots of folks around here used to do that to keep the young'uns from getting the cough."

Although none of the informants could offer an explanation of the origin of this practice, all agreed that they had been locally advised to follow the procedure to prevent or reduce the cough, and they believed their efforts had been worthwhile. The use of the gristmill for whooping cough was known in western North Carolina[6] and Pennsylvania[7] and persisted in isolated neighborhoods in Virginia and West Virginia until recently.

MEASURING

A surprising number of natives of Pennsylvania, Maryland, Virginia, and West Virginia were once "measured" to test whether they were suffering from an affliction called *undergrowth* or *das abnehme* in the dialect. Such a fear persisted when an infant or child appeared "puny" or "scrawny" and was not growing as others of the same age and sex.

A granny-woman determined if the child was afflicted by measuring it with a red string. One such granny-woman described the process as follows: "We only measure in the increase of the moon; the full moon is best, and it's no use doing it in the waning. Measure from the heel to the toe, from the wrist to the elbow, and if the two measurements multiplied by seven do not equal the length of the body from head to heel, the child has undergrowth."

In Pennsylvania, *abnehme* was treated by drinking sheep-dung tea, but in the Appalachians and the Shenandoah Valley, sheep-dung tea was used in treating measles, and undergrowth was treated by passing the afflicted child through a loop made from the measuring string while special words were silently recited by the practitioner. The string was carefully disposed of in order to avoid its coming in contact with others and to assure its rapid deterioration. The basic belief was in the transferability of the ailment from the child to the string, and it was assumed that when the string rotted or disappeared, the ailment would be gone.

There are a number of variants of this practice, including the wearing around the neck of an amulet which contained a Biblical verse, a piece of silver, asophidity (asafetida), and stale bread crumbs. In some neighborhoods, measuring includes greasing: as one granny-woman noted, ". . . we grease them all...strip them bare and grease' em all over, body, arms, legs, feet and soles."

LIVER-GROWN

Another ailment feared in earlier times was called *liver-grown* or *awachse* by the German element. Symptoms included sharp shooting pains with every breath of air; the disease was attributed to being bounced and jounced around in cold windy weather. This was believed to cause the growing together of the liver and the ribs.

The treatment was thumb-greasing along with an incantation recited during the rubbing. A granny tells us, "I simply grease the children from head to toe with hog lard . . . they bring them even now-a-days . . . you put your thumbs together and press down hard over the ribs and go clear around to the backbone . . . I say the words as I do it . . . three times!" Others insist that the procedure must be done in a waning moon, that the afflicted must be placed through a warm horse collar, or that the grease used must be from a specific animal such as a groundhog, coon, possum, or goose.

GREASING

The use of home-rendered fat was virtually universal in the rural areas, where it was used as a plaster or poultice, rubbed on as a liniment, taken orally as internal medicine, and used as a base for herbal salves.

Rattlesnake oil was considered unusually effective for the "miseries" (rheumatism). Possum grease was highly rated for treating stiff joints and aching feet. Angle fish worm oil for arthritis pains in fingers and wrists, melted bear grease for earache, goose grease for quinsy throat, bacon rind for boils, warts and hives, sheep tallow and beeswax for cuts, and hog lard for almost anything complete the list.

Nor was grease always used directly. In cases of cuts and gashes it was quite often applied indirectly and in an occult fashion. One informant said, "When my brother cut

his foot with an axe, a neighbor grannywoman made a special trip to tell us what to do. She said, 'Grease the axe with hog lard and lay the axe in a dark place to keep the foot from getting sore,' by which she meant getting infected."

SWAINEE

In the days of self-sufficiency, the loss of a beast of burden was considered disastrous. Several mysterious afflictions were feared; *hollow-horn, wolf-in-the-tail,* and *swainee.* The first two were treated with salt and silver but the latter was always referred to a powwow practitioner. Generally, swainee was a swelling around the shoulder which was thought to cause a drying of the flesh on the bones and eventual death.

Several practitioners still use the Old World treatment of driving the affliction from the beast into the earth by means of gestures and incantations during the period of a full or waning moon. We once witnessed, photographed, and tape recorded a dialect-speaking mountain witch doctor treating a horse using the early ritual. She started by stroking the horse's shoulder three times. Then, holding the mane, she pronounced the first part of the incantation, which, translated from the dialect, reads:

> Swainee, I want you to leave
> Out of the marrow into the bone
> Out of the bone into the flesh...

Gradually her hand moved down the animal's body as the words flowed:

> Out of the flesh into the hide
> Out of the hide into the skin
> Out of the skin into the hair...

The movement of her hands continued down the body until near the hoof her thumb pointed downward and touched the earth as she said:

> Out of the hair into three-quarters of the earth.

The incantation was concluded with the words: "In the name of God the Father, God the Son, and God the Holy Ghost."

The procedure was repeated three times. She noted that if the horse was not cured the ritual could be repeated during the next full moon but it could not be done more than three times (Figure 1).

Fig. 1 An Appalachian female powwow practitioner beginning an early ritual for the treatment of swainee in a horse. Her incantation was repeated three times in the Pennsylvania Dutch dialect.

GOITER

The occult treatment for goiter was a specialty basically reserved for those few who could also treat swainee, warts, and tumors, using the full moon. One aged practitioner

told us he could *only* treat these afflictions, adding, "I cure only on Friday in a waning moon and the people have to be quiet.[8] I look at the moon over the right shoulder and rub the growth with paper and say the words. Later I bury the paper under the eaves of the house. When the paper rots the growth should be gone." He assumed that the power he had was given him by God and that he must use it when asked without charging for it. His mother and grandfather had also treated hundreds of people from a thirty-mile radius, and he revealed that he learned the rituals and procedure from his mother, who had been taught by her father.

ERYSIPELAS

What the folk refer to as "Wild Fire" is most probably erysipelas as it is characterized by fever and a reddish rash. Folk treatment is primarily in conformity with the belief in the Doctrine of Similarities, which assumes that similar items are related in cause and effect. This folk belief was first noted by James Frazer in *The Golden Bough.*[9] In the case of erysipelas, the procedures involve the color red and heat: red hot coals thrown over the afflicted into the fireplace; a red corn cob set afire; red flax string rubbed over the rash and disposed of in a fire, or some similar act.

RUPTURE

When an infant was thought to suffer from a rupture, several occult procedures were applicable. A small onion could be rubbed over the afflicted area, and the onion then buried upside-down in an inaccessible place. When the onion decayed, the rupture was assumed to be healed. The ordinary hen's egg was also used in a similar manner. Because the ailment was believed to have been transferred from the person to the egg through the process of rubbing, a proper disposal of the egg was of vital importance in order to avoid contagion.

The once sacred oak tree was also used to treat rupture. The oak tree was considered holy by the early Germanic tribes and by the ancient Hebrews, and it was worshipped by the Druids.[9] Nearly a century ago an early account noted how an anguished mother ". . . had done all she knew to do for her sickly infant . . . and had it passed through an ash-tree."[10]

A mountain man explained how he had split a number of saplings for a local granny-woman, saying, "The sapling is split with a wedge and the infant is passed through the separation from east to west three times before sunrise." He added, "She mumbles words but you can't tell what they are, then the tree is bound together ag'in and when it heals the child is healed."

RESTLESSNESS

A child who was continually restless and unable to sleep well was thought to be hexed by a spell placed on it by a witch. The persistent crying of a child was assumed to be caused by diabolical influences. It was believed that such a spell could be prevented by placing an open Bible under the pillow of the child, or the child could wear an amulet around the neck. The neck amulet consisted of a cloth sack in which were placed asafetida, a dime, and a verse from the Bible. The silver was believed to thwart witches, the foul smell of asafetida was once thought capable of warding off all evil, and religious verses were believed to counteract the power of the devil.

To cure restlessness caused by a spell, special rocks were sought and placed under the child's pillow to provide a peaceful rest. Such a rock was usually sought under a chuck rail of a split log fence. The folk saying "What a fence rests on, so will a child" follows indirectly the application of the Doctrine of Similarity with emphasis on resting.

RHEUMATISM AND ARTHRITIS

Perhaps the most common single complaint of the hard-working adult population was the pains from rheumatism and arthritis. Aching joints were the subject of numerous folk treatments, including teas made from thistle, watermelon, alfalfa, or boiled rusty nails, and grease made from almost any living creature, including buzzards and angle worms. The afflicted sought relief by sleeping with a pair of scissors under the pillow, by wearing a piece of copper in one shoe and zinc in the other, and by wearing a copper bracelet or earrings.

The most widespread preventive practice was the use of an amulet carried on the person. There was great faith in the horse-chestnut or buckeye, a small potato, or nutmeg. Some folks kept a chihuahua dog in the home to ward off pain, although dogs

An occult treatment used by some powwowers was: "Trim the fingernails on one hand and toe nails on the opposite foot. Reverse the process and dispose of the clippings in a hole of a tree. Plug up the hole by striking the bung with an axe three times while saying the high words."

ASTHMA AND CROUP

The treatment for asthma and croup often included a form of measuring and the use of a tree. This procedure is referred to as "nailing in a cough" in some neighborhoods. A granny-woman explains, ". . . the child is taken to the woods and placed against a tree. A hole is cut in the tree at the top of her head, a lock of hair is placed in the hole and it is plugged up." Variations include the necessity that the tree be of a specific species such as apple, that the procedure should be carried out in complete silence, that the child must face east, and that the treatment must take place before sunrise.

Occult treatments have been and are used for many other ailments including bleeding, bed-wetting, stuttering, thrash or thrush, teething, sty, sprains, chicken pox, and jaundice.

THE USE OF AMULETS

In earlier times the powwower often resorted to the use of written word charms as preventives for various feared afflictions and potential tragic occurrences.

One twelve-page hand-written manuscript almost exclusively in German script with traces of the dialect, obtained from descendants of early German settlers in the mountains of eastern West Virginia, contains sixty-four occult remedies, including several word or letter charms, such as the following:[11]

> To stop blood, take a straw, put blood on it, Write the following letters on the forehead of the person who is bleeding: O.I.P.U.L.U.

A similar charm is recorded in the account book of count book of Henry Kolb of Skippack Township, Montgomery County, Pennsylvania.[12] The remedy book from the mountains has instructions for another treatment which reads: "OAE + VEOAEP * BEOAEV to be used against cramps."

The meaning of the letters in both of the above remedies is unknown, although they have been found in similar occult documents and have been used in various regions of the country and are noted in early occult books.

Included in the manuscripts was the so-called magic square:

4	3	8
9	5	1
2	7	6

The addition of any three figures in line will total 15. This and similar magic squares which total 72 were believed to work as charms against being bewitched.

Perhaps the most common of early word charms was the so-called SATOR mystery, which has been found in various forms on numerous objects and in Latin, German, Greek, Coptic and Hebrew. The earliest of them appeared on bronze located in Asia Minor dating to the fifth century A.D. This charm reads:

S	A	T	O	R
A	R	E	P	O
T	E	N	E	T
O	P	E	R	A
R	O	T	A	S

This charm was used primarily as a protection against fire and was inscribed on or in buildings. The structures at the cloister of the Sabbatarian monastic sect at Ephrata, Pennsylvania, were once believed to be immune to fire because of a mystical inscription,[13] and it was also used elsewhere in the New World.

A second hand-written document dated November 27, 1837, found in the southern Shenandoah Valley, used the Sator formula in a variety of ways. It proclaims in part:[14]

> ...whosoever carries this with him or has it in his house will not be burnt up neither will lightning or thunder consume his house and if small children have fitts write these 25 letters on a bitt of paper lay it under the childs back 24 hours...the child will never have them again...also if any person have been bitt by a mad dog and these letters are given him to eat it will not hurt him.

The Sator charm has also been used to ease labor pains in childbirth, toothache, and headache, and to ease wounds, burns, and fever. Thomas Forbes, associate dean of the Yale University Medical School, has noted, "The Sator square, which has puzzled scholars since the Middle ages, puzzles us still.[15]

Perhaps the most distinctive characteristic of the Pennsylvania powwower, compared with occult healers of the other regions in America, is the use of the printed *himmelsbriefe* or "heavenly letters." The German peasantry believed these letters were actually written in heaven and had been dropped to earth at Holstein (1724) and Magdeburg (1783) and elsewhere. These were assigned extraordinary protective powers and were printed by several early inland printers in Pennsylvania, who made them available to the public.

Dr. Forbes notes that such charms were "found on the bodies of many Saxon soldiers in the wars of 1866 and 1870-71" and notes that the letters were used in Germany as recently as 1912. In America the last popular use was at the beginning of World War I when the Aurand Press, Harrisburg, Pennsylvania, custom-printed a considerable quantity which were distributed to men inducted into military service from Snyder, Union, Mifflin, and Juniata counties. This version was the Holstein letter of protection because it appropriately included aid in war:

> Whosoever has this letter shall not be be taken prisoner, nor wounded by the enemy. Amen...he shall not be shot, but shall stand unhurt and adjure all guns, and weapons...

The himmelsbriefe in their various forms offer protection against robbers and murderers, lightning, infertility, epidemics, hard times, hydrophobia, severe labor pains, and similar human afflictions. The Pennsylvania powwower often made these printed charms available to patients, but occult practitioners elsewhere seldom used them.

Other more obscure charms in printed form were also available which served to offer

protection against evil forces and specific afflictions including pestilence. Although the origin and meaning of many of these charms are obscure several are included in the works of John George Homan, published in 1820 in Berks County, Pennsylvania.[16] Others have been attributed to the thirteenth-century scholar-mystic Albertus Magnus[17] and other European sources.[18]

Quotations in this presentation were taken from taped interviews with individuals who were of Pennsylvania German heritage. The majority were life-long residents of Virginia or West Virginia, and a select sample were from western North Carolina and Maryland. The informants were members of families who migrated from Pennsylvania prior to 1800.

In this region many of the cultural beliefs and practices of the distant past have been handed down through the family. In those isolated agrarian sections where this ethnic group dominates and where homogeneity is characteristic, the folk beliefs have been perpetuated to a surprising degree. It is in such an environment that the witch doctor survives to the present.

In larger towns and communities with a more heterogeneous heritage the old-time ways are seldom handed down to the younger generations for use, and knowledge about them is fragmented or entirely lost. Nevertheless, throughout the entire region there remain in almost every neighborhood the special person with powers to heal specific afflictions, and people who turn to them to remove warts, stop blood, or treat burns. Such occult healers do not consider themselves involved in the supernatural, instead they simply "know" that for some unknown reason they were selected by God, directly or indirectly, to be able to "blow on burns" or "stop blood." Furthermore, they feel compelled to use this God-given ability to help the afflicted when requested and without compensation for their time or effort.

In this category of healing there do not appear to be any common characteristics among the practitioners in terms of social class, educational achievement, or economic status. Such persons are known in the upper, middle, and lower classes, in white and blue collar occupations, and with educational level ranging from postgraduate collegiate to lower elementary school. Church affiliation may be any of the major denominations or sect groups including Mennonite and Amish.

The general powwower and witch doctor are becoming quite rare. They are of the older generation, usually with very limited formal education; they were reared and have lived in remote areas; they were in constant contact with the occult from early life; their world-view is almost entirely local, and the life-style is that of poverty. Quite often the practitioner actually has considerable net worth in land which is not reflected in the style of life. One powwower with an unusually low standard of living actually owned more than 2,200 acres of land, much of which was suitable for farming and grazing.

The female practitioner is invariably undereducated and often functionally illiterate. Few have travelled beyond the local village during an entire life time. The standard of living is low with few modern conveniences. In almost every case the female with occult powers uses rituals and procedures handed down over the generations but without any full understanding of their meaning or historical perspective. Their rituals were simply the "right way to do" because "that's how granddaddy taught my daddy."

Today the number of individuals who attribute sickness, affliction, and death to evil forces are few. The belief in powwow procedures persists but with a qualitative difference, for in the past there were many who believed the practitioner had *proved* his powers and others felt the healer could

probably help them, but today most people simply claim they might *possibly* cure them.

At the present both the practitioner and the patients appear to base their hopes on faith. The healer confesses he doesn't know why or how his procedures work, but he claims that somehow they often bring the desired result. The patient, on the other hand, clings to hope. Both continually assure themselves and each other that "Through God all things are possible."

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The Men on the Walls — III
ASCLEPIUS

By JOHN L. McCLENAHAN, M.D.*

The nymph Coronis, daughter of a tribal chief, was surprised by Apollo while bathing her feet in a mountain stream and was made pregnant. As a child she had been betrothed to her cousin Ischys. When informed of this at Delphi by his herald, a white raven, Apollo responded with characteristic wrath. He struck the bird black for all time. He slew Ischys while Artemis, his sister, put Coronis to death with arrows. And then in pity he delivered her corpse of his son Asclepius, a name no man can trace. Some say it belonged to an ancient king; others note its resemblance to *aspalax,* the blind mole that (with the snake) brought healing to mankind from the depths of the earth.

Apollo turned the child over to Chiron the Centaur, the wisest and most gentle member of a scandalous breed and the tutor in later years of Jason and Achilles. He was taught the arts of war and of hunting, and every secret of leechcraft — the use of herbs, music, soothing incantations and the surgeon's lance. It seems likely that he served as ship's surgeon with the Argonauts on their quest for the Golden Fleece, and when he returned he married Epione, a princess of Cos. They begat a line of prodigies. The oldest sons, Machaon and Podilarius, were cited by Homer for their valor and their skill as physicians with Agamemnon's army at Troy. Hygieia, the oldest daughter, eventually enshrined as goddess of Health, is conventionally depicted with her sisters Aceso, Iaso and Panacea. Telesphorus, the youngest son, became the patron of convalescents. Coins and bas-reliefs often show him standing beside his father. Asclepius, usually a bearded figure, no longer young, wears a long coat open over the chest. His hand rests on a knotted staff around which a single serpent is curled. His dog stands beside him.

As centuries passed the man became a hero, the hero a god and an object of worship of a vigorous cult. Ardent missionaries carried his lore throughout the Mediterranean basin — "Touched by his healing hand the pale diseases fled." Cures were first wrought in the mountain grottoes of central Greece, then in the Peloponnesus at Epidaurus, then in Asia Minor, in Libya and, in 293 B.C., at Rome itself. Here the advent of the god was particularly impressive. The city, in the grip of an epidemic, sent emissaries to Epidaurus to plead for help. Asclepius boarded their ship in the incarnation of a serpent, glided to beflowered quarters on the afterdeck and on reaching the Tiber disembarked in the reeds of the Isla Sacra. A temple was built on the spot and health was restored to the community.

The regimen of Asclepius neglected neither body nor soul. At Epidaurus his temple stood in a valley sheltered by steep hills, amply watered by pure springs. The emphasis of treatement was on purity and refreshment. Baths were provided, plays, concerts, footraces, acrobatics. The distractions of birth and dealth were banished to a special pavilion slightly removed from the town.

Therapy relied heavily on ritual and on cultivated expectation. An ailing suppliant was bathed, properly purified and given a new tunic. He offered sacrifices according to his means — fruit, honey cakes, a lamb or a

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rooster. Recovery began with a conducted tour through a gallery of votive columns where case histories were recorded testifying to the cures of others, many with hopeless afflictions. After sunset he was taken to the *abaton,* the heart of the sanctuary, and given a pallet to sleep on. Through the night he *incubated* in the strictest sense and the god appeared in a dream, perhaps accompanied by a priest, Hygieia, and the friendly snake. He touched the sick man and gave him medicine. He might operate on him; his dog might lick the wound. In the morning pain vanished, sight and healing were restored and the abscess ceased throbbing.

As is natural, God could not always be forced and occasional doubt or impiety precipitated failure. When healing did not take place after several seances the patient was directed to seek help elsewhere. When it did he was encouraged to record the particulars of his case on a votive stele, perhaps with a model of the ailing arm or leg. Many of these still stand for the tourist to ponder. Heraieus of Mytilene, bald for years, awakened after treatment with a luxuriant head of hair. Gorgius of Heracleia, with empyema that discharged sixty-seven basins of pus in eighteen months, left the shrine wholly recovered, carrying the offending arrowhead in his hand. Poor Cleo, pregnant for five years, left the *abaton* in the morning and delivered a lusty boy who washed himself in the fountain and took his mother for a walk. And there was Euphanes, a lad of Epidaurus, who suffered from stone. In a vision the deity said, "What will you give me if I cure you?" "Ten dice," the boy replied. Asclepius laughed and cured him.

It was avarice and success, we are told, that brought down Asclepius. In restoring a certain Hippolytos from death the blameless physician was moved, at last, by the desire for gold. His jeopardy was compounded by an effort to bring Orion back to life after a scorpion sting. Hades, "fearing unemployment," complained to Zeus that his entire kingdom would be depopulated if this sort of thing continued. So, to accomodate his brother, Zeus struck down Asclepius with a flaming thunderbolt. Apollo, true to form, destroyed the Cyclops that forged the fatal bolt.

But Zeus, too, could relent. He raised Asclepius, translating him into the heavenly constellation, The Serpent Holder — seen in our latitudes late in July, low in the southwest over Antares. He has lost his staff but holds his snake firmly aloft with both hands.

His disciples served till the sixth century A.D. as the chief barriers to the spread of Christianity. The reason is simple, ironic. The religions had so much in common that simple minds could not tell them apart. They were, to the mortification of the early Fathers, equally accepted. Could not Christ be viewed as the new Asclepius? Both were god-men, sons of mortal mothers and divine fathers. Both led blameless lives. Neither fought a battle. Each preached a gospel of altruism and miraculously gave men their dearest wish: respite from pain and disease. Each radiated a purity of his own — "Pure must be he who enters this fragrant temple..." "...except ye become as little children ye shall not enter the kingdom of heaven." Both were mysteriously carried away to heaven after violent deaths. Scholars point to one crucial difference between them: Christ's declared ministry to the *impure*, to the publicans and sinners who, by faith alone, could be made whole.

Memoir of Charles A. Behney (1891-1976)

By STANLEY C. CLADER, M.D.

Charles August Behney died on May 12, 1976, at his home in Tucson, Arizona. He was 84 years of age and had lived in Arizona since his retirement about 13 years ago. At one time, he was an active and esteemed member of the Philadelphia medical community. He departed from this area in 1949, yet many still fondly recall their pleasant associations with him in years gone by.

Born in Myerstown, Pennsylvania, on October 7, 1891, Dr. Behney received his undergraduate education at Ursinus College, from which he was graduated in 1912. We are told that he starred on the football team at that institution. He was graduated from the School of Medicine of the University of Pennsylvania in 1917 and served his internship at the Hospital of the University of Pennsylvania. He served with the U.S. Army Medical Corps during World War I.

He then began his training in obstetrics and gynecology under Dr. John G. Clark. He was an associate in obstetrics and gynecology at the University of Pennsylvania School of Medicine and assistant professor of obstetrics and gynecology at the Graduate School of Medicine. Before leaving the Philadelphia area, he was chief of the Department of Obstetrics and Gynecology at the Bryn Mawr Hospital, and was also on the staff of Presbyterian Hospital and Philadelphia General Hospital. At the latter institution he was well-known for his work in the Radiologic Clinic, where he did extensive work in the treatment of carcinoma of the cervix with high voltage Roentgen rays. His publications on various subjects in his field numbered 19. He became a diplomate of the American Board of Obstetrics and Gynecology in 1934 and later served as an associate examiner for that body.

Shortly after leaving Philadelphia, Dr. Behney became associated with the hospital at the Atomic Energy Depot at Los Alamos, N.M., and later served as maternal health consultant for the State of Michigan.

For those who were privileged to train under Dr. Behney, he was a stern disciplinarian. His rules and methods were demanding and precise and he always expected his trainees to carry them out to the letter. Although a strict preceptor, however, he freely offered his praise when he recognized a job well-done.

Dr. Behney maintained a small farm in Chester County while practicing in Pennsylvania. He loved to entertain his friends and associates "at the farm." His professional society memberships included the Obstetrical Society of Philadelphia and the American Gynecological Society as well as the College of Physicians of Philadelphia.

Memoir of Herbert Freed (1908-1976)

By O. SPURGEON ENGLISH, M.D.

The College of Physicians and the City of Philadelphia lost one of their most valued physicians on December 25, 1976, when Herbert Freed died at the Temple University Hospital. He was sixty-eight years of age and had lived at 431 Upsal Street in Germantown. He had spent all of his professional career specializing in the field of psychiatry and neurology and psychoanalysis.

Dr. Freed was graduated from the Temple University Medical School in 1933, after which he was a resident at Philadelphia General Hospital until 1938. He later served there as a staff physician and as chairman of his Child Psychiatric Clinic. During his many years of practice he had offices in the Medical Tower Building until two years ago, when he moved his practice to his home. He joined the staff of the Department of Psychiatry of the Temple University Medical Sciences Center in 1938, and was eventually made clinical professor of psychiatry there in 1958.

Dr. Freed was a man of many interests and had many affiliations during his lifetime. He was a diplomate of the American Board of Psychiatry, and a Fellow of the American Medical Association, American Psychiatric Association, American Psychoanalytic Association, Philadelphia Psychiatric Society, Philadelphia Psychoanalytic Institute and the College of Physicians of Philadelphia (for 24 years). He was a member of the American College of Psychiatry, American College of Neuropsychopharmacology, International Psychoanalytic Association, Eastern Psychiatric Research Association and the Association for Research in Nervous and Mental Diseases. In 1963, he received the Philadelphia County Medical Society's annual DaCosta Award. For many years, he had been an examiner for the American Board of Neurology and Psychiatry and was psychiatric consultant for the Veteran's Administration and the Peace Corps.

He was much appreciated as an erudite lecturer in his own University, in his own city, and abroad, and produced eighty published papers and books. He was a contributor to Spiegel's *Progress in Neurology and Psychiatry* along with Spiegel and Henry T. Wycis. He also authored the "Psychoanalysis" chapter in *Progress* for fifteen years from 1955 to 1970. He was the author of a monograph, *Chemistry and Therapy of Behavior Disorders in Children,* published in 1961 by Charles C. Thomas.

All these titles and associations and the record of his accomplishments still do not do justice to the man who was known and beloved by so many students and colleagues. I had the privilege of having Dr. Freed associated with me during my career as head of the Department of Psychiatry at Temple University Medical Sciences Center. He joined me soon after my arrival there and was a most able assistant and associate for all the years I was there; he remained there and continued to work and give his loyalty to my successors in the same way he had done to me for these many years. He was extraordinarily well read and informed in psychiatry and many fields connected with it. He was a lively, interesting lecturer and seminar leader. He organized and was chairman of the Annual Psychotherapy Conference at Temple University Health Sciences Center from 1957 to 1976. He was well known to men of great stature in this country and abroad and obtained the most excellent people for this

conference, which has always been popular, well attended, and appreciated by many people within the field of psychiatry.

He was married to Judith Sillman. Judy, as she is known, was a charming companion in a happy marriage and shared in many of his meetings and travels. They had two daughters, Marcia, who became a physician, and Mrs. Joanne Belsky; both survive him.

There was never any task or assignment that Herb Freed would not accept and do well and with great credit to the department, the medical school, and himself. Herb was not just an industrious worker and teacher in the field of psychiatry. He was an indefatigable worker, teacher, and scholar. He presented his own material in an interesting manner and was knowledgeable, penetrating, and gracious in his discussion of other people's work and ideas.

His generous and brilliant presence will be greatly missed by his many friends and colleagues, his University, and the many organizations with which he was affiliated and to which he gave his efforts. I personally mourn the loss of a long-standing friend and colleague who was of inestimable value to me.

Memoir of Charles Michael Gruber (1887-1974)

By J. M. COON, Ph.D., M.D.

Charles M. Gruber, educator, scientist, physician, and professor emeritus of pharmacology of Thomas Jefferson University, died on November 19, 1974, in Loma Linda, California. He was 87 years old.

Dr. Gruber became professor and chairman of the Department of Pharmacology at the Jefferson Medical College in 1932, and retired from that position in 1953. He did not, however, go into retirement. He immediately took the chairmanship of the Department of Pharmacology at the College of Medical Evangelists in Loma Linda, where he had been invited to establish and build a new department. Four years later, in 1957, after having accomplished that mission very successfully, he resigned and became visiting professor of biology at the University of Redlands in nearby Redlands, California, where he and Mrs. Gruber had established their home upon leaving the Philadelphia area. Dr. Gruber continued teaching in this capacity until 1963, when he finally retired at the age of 76, having taught continuously for 52 years, 46 of them in medical schools. By his own count he took part in the medical education of 4,976 physicians.

Dr. Gruber was born on March 11, 1887, in Hope, Kansas. He was the youngest of nine children of German emigrant parents who were homesteaders on a Kansas farm. He first acquired an interest in biology and medicine during his high school days, when the family physician encouraged him to come to his office to browse through Gray's *Anatomy*.

Dr. Gruber was as tireless and enthusiastic in research as he was in teaching. When he came to Jefferson he had already authored and coauthored 82 scientific papers in the fields of physiology and pharmacology. During his 21 years at Jefferson this number was more than doubled, to 177. He was also author of the *Handbook of Treatment and Medical Formulary* and from 1948 to 1953 he was associate editor of the *Cyclopedia of Medicine, Surgery and Specialties.* His contributions in research dealt largely with muscular and cardiovascular physiology, and with the pharmacology of morphine, papaverine, quinidine, posterior pituitary hormones, the benzyl esters, meperidine, diphenylhydantoin, and the barbituric acid and thiobarbiturate derivatives.

Dr. Gruber started his scientific career as a physiologist. After graduating with the A.B. and M.S. degrees from the University of Kansas in 1911 and 1912 he earned the Ph.D. degree in physiology at Harvard University in 1914. He subsequently held faculty positions in the Department of Pharmacology at the University of Pennsylvania School of Medicine, and the Departments of Physiology and Pharmacology at Albany Medical College, and at the University of Colorado School of Medicine. He took leave from the latter position to complete a medical education at Washington University in St. Louis where he received the medical degree in 1921. After serving an internship at Barnes Hospital he remained at Washington University as associate professor of pharmacology, while also serving as physician to out-patients at the University Dispensary. It was from this position that Dr. Gruber came to the Jefferson Medical College in 1932.

During his long and productive professional career, Dr. Gruber played an exceedingly active role in many scientific and

medical societies at the local, state and national levels. Most notably, in 1953, he was elected president of the American Society for Pharmacology and Experimental Therapeutics, which he had previously served as vice president and as treasurer. He was a member of the American Physiological Society and a charter member of the American College of Cardiology and of the Central Society for Clinical Research. He served a term as chairman of the Section of Pharmacology and Experimental Therapeutics of the American Medical Association, and nine years as alternate delegate to the A.M.A. House of Delegates. Among the numerous honorary fraternities and societies of which he was a member were Alpha Omega Alpha and Phi Beta Pi. He was National Supreme Archon of the latter from 1941 to 1943 and was named Man of the Year of that fraternity in 1958.

Typical of his indomitable spirit, after retiring from his last teaching position in 1963, Dr. Gruber remained active in numerous community affairs in Redlands. He served as a deacon in the First Congregational Church and as a member of the board of directors of the Patton State Hospital, and he was a leader in the Redlands Horticultural and Improvement Society. He gained local fame as a flower gardener and was known for his eight-foot-tall delphiniums. The Redlands Day Nursery was one of his chief interests during these years.

In his long life of dedication and action Dr. Gruber played a major role in the development of the science of pharmacology during that period in its history when it was coming into its own as an independent academic discipline, and when the medical schools of this country were beginning to establish separate departments for teaching and research in this relatively new field of basic and applied science. Dr. Gruber's name is, figuratively, written in capital letters in the annals of American Pharmacology.

Memoir of Margaret I. Handy (1889-1977)

By LEWIS B. FLINN, M.D.

In 1972, the College of Physicians of Philadelphia granted an Honorary Fellowship to Margaret I. Handy, M. D., widely known and admired pediatrician of Wilmington, Delaware, the first woman so honored in this organization's 200-year history. Doctor Handy, apparently through no negligence of her own, even at age 87, suffered a severe automobile accident on July 17, 1976, from which she slowly recovered only to die suddenly from a stroke on February 5, 1977. The tributes expressed widely in the national press confirmed the wise decision of the College in granting her Honorary Fellowship in 1972.

Doctor Handy was born in Smyrna, Delaware, on May 27, 1889, graduated from Goucher College in Baltimore in 1911, and after some family controversy entered Johns Hopkins Medical School, graduating in 1916. While in medical school she marched in the 1913 Suffragette Parade in Washington, D.C. After further hospital training, including resident training in pediatrics at the Harriet Lane Home at the Johns Hopkins Hospital, she started practice in 1918 in Wilmington, where she was the only physician, male or female, to limit practice to pediatrics. It was at the time of the great influenza epidemic and almost immediately she was completely involved. Physicians and patients and the entire community, after some considerable initial resistance, gradually became admirers, friends, and cohorts. Her compassion and concern for children was real and abiding. Her gentleness with children immediately gained their confidence. Her salty and "purple" explosions against any who interfered with what she thought was best for her patients caused bitterness among many physicians at first, but ultimately redounded to her credit and enthusiastic acceptance.

Doctor Handy started the first Pediatric Clinic in Delaware, and the first Human Milk Bank in the nation, which is still functioning. The only other Milk Bank, patterned after Delaware's, is the Milk Bank in California. She received many citations and honorary degrees, especially from the University of Delaware, Goucher College, the New York Infirmary, and Wesley College in Dover. She was a Diplomate of the American Board of Pediatricians, and in 1953 received the Josiah Marvel Cup as the most distinguished Delaware citizen of the year. She received worldwide renown as the subject of Andrew Wyeth's widely acclaimed painting "The Children's Doctor."

Truly a remarkable woman, an outstanding pediatrician, modest, sincere, and forthright, a tremendous force through four generations of children, Margaret I. Handy was the right person in the right profession at the right time. It is not conceivable that one like her will ever again appear.

Memoir of Valentine Richard Manning, Jr. (1912-1977)

By JAMES F. O'NEILL, M.D.

Valentine Richard Manning, Jr., was born in Philadelphia on March 14, 1912, one of five children of Valentine Richard Manning, M.D., and Alice (McGurk) Manning. His father had graduated from the Medico-Chirurgical College in 1902 and specialized in proctology. He had his office at 800 East Allegheny Avenue in Philadelphia and was a busy and highly respected practitioner until the time of his death on January 8, 1941.

The younger Dr. Manning received his early education in Philadelphia parochial schools, and he subsequently graduated from Saint Joseph's Preparatory School and Temple University College of Liberal Arts, receiving a B.A. degree from the latter institution in 1934. He pursued his medical studies at Temple University Medical School, securing his M.D. degree in 1938.

Internship followed at Temple University Hospital from 1938 to 1940, after which he maintained an intensive interest in proctology, serving as assistant in proctology at Temple, Graduate and St. Joseph's Hospitals and consultant in proctology at the Quakertown Community Hospital.

From 1942 to 1946 he was a medical officer in the United States Air Force, serving as chief of proctology successively at Randolph Field, Texas; Air Force Navigation School at San Marcos, Texas; Enid Air Field at Enid, Oklahoma; and Selman Field, Monroe, Louisiana.

Following his military service, he was instructor in proctology for many years at both Temple University Medical School and the Graduate School of Medicine of the University of Pennsylvania. During these years, up until the time of his terminal illness, he also carried on a busy proctologic practice at Nazareth and Holy Redeemer Hospitals and at offices in northeast Philadelphia and Huntingdon Valley.

He authored 18 papers in his specialty and remained quite active in the affairs of both medical and community organizations. He was a member of the Philadelphia County Medical Society, the Pennsylvania Medical Society, the American Medical Association, the International College of Surgeons, the College of Physicians of Philadelphia, the American Proctologic Society and the American Society of Colon and Rectal Surgeons.

He was also a member of the Knights of Columbus and the Historical Foundation of Pennsylvania, and was president of Philadelphia's first Toastmaster Society. Dr. Manning was a former treasurer and secretary of the Philadelphia County Medical Society and fomer president of its Northeast Branch. He was the recipient of the "Voice of Medicine" Award of the Pennsylvania Medical Society.

He maintained a keen interest in the affairs of the medical staffs of both Nazareth and Holy Redeemer Hospitals and served as parliamentarian of both groups. They relied on his calm judgement in all problems of preparing, revising and interpreting the staff by-laws. His aid was most valuable when staff meetings sometimes became slightly tempestuous. Then, with his cigar in one hand and a copy of *Robert's Rules of Order* in the other, he always succeeded in converting the heat to light and restoring productive order.

Over the years he derived great pleasure from driving a succession of stream-lined sports cars, carefully cared for and driven with verve and a flair, with a British-type sports cap and again his cigar. For many years he enjoyed the avocations of raising tropical fish and culturing dwarf evergreen shrubs, adding, in his later years, enthusiastic participation in scuba diving combined with underwater color photography. He pursued all these hobbies with his characteristic careful and searching enthusiasm. He could identify both tiny fish and tiny shrubs with their scientific names and cultural characteristics; his library of colored photos taken while scuba diving was greatly cherished. Still, these interests were always ancillary to the great interests of his life — his family and his profession.

The presence of a carcinoma of the head of the pancreas manifested itself in June, 1976, and he stoically endured a radical resection, making a good immediate recovery, only to be felled seven months later by the development of insidious hepatic and other metastases.

Dr. Manning was fully aware of the nature of his illness and, at his request, was kept fully informed of the behavior of his aggressor. He faced every phase of his terminal illness with dignified and apparently limitless courage. Even in the later and and weakening phases of the disease, bolstered by his deep and sincere faith and the superb care given him at home by his close relatives and friends in the nursing profession, he faced the final issue with a magnificent resignation that was both an inspiration and a consolation to his loved ones.

Dr. Manning is survived by his wife, the former Frances B. Blanch, three sisters, and three sons, Michael R., Terence J., and Dennis J. His family, friends, patients and colleagues will greatly miss this gentle and gentlemanly physician who did great credit to his profession.

Memoir of Ralph Whiteman Mays (1907-1976)

By JOHN L. McCLENAHAN, M.D.

On June 29, 1976, Ralph Whiteman Mays died suddenly at the age of 68 at his summer home in Maine, and an extraordinary career came to a close.

He was born in Germantown on December 16, 1907, a fourth generation "Germantowner." He attended Germantown High School, the University of Pennsylvania, and the University of Pennsylvania School of Medicine. Following a two-year internship at Germantown Hospital begun in 1932, he served many years in its Medical Clinic, and also at Pennsylvania Hospital. While in medical school, he was deeply involved in the Germantown Boys Club, both locally and in Ocean City.

He was a dedicated staff member of Germantown Hospital for forty-four of his sixty-eight years. He was associate professor of clinical medicine at Jefferson Medical School from 1958 to 1968 and clinical professor of medicine at Temple University Medical School from 1965 to 1974. He was responsible for the growth and development of the medical service at Germantown Hospital and was director of the Department of Medicine from 1951 to 1970 and president of the medical staff in 1963 and 1964.

He was instrumental in organizing and developing the heart station and later the cardiac unit and other specialty departments at Jeanes Hospital between 1946 and 1973. He also served as president of the medical staff and chief of medicine there, always maintaining the highest standards of medicine.

A four-year stint in the United States Air Force from 1942 to 1946 was the only break in his service to his Philadelphia patients and to his hospitals in the practice of internal medicine. He was a Fellow of the American College of Physicians, the American Board of Internal Medicine, and the College of Physicians of Philadelphia. A voracious reader and historical scholar, he often confided that he fought the Battle of Germantown as he traveled the main street. He was a physician's physician — what more can one say of his ability? There are few in Germantown who have not been touched by his compassion, his deep religious convictions, and his love for his fellowman. This was uniquely demonstrated at his memorial service on a Fourth of July weekend.

He was married in 1940 to Evangeline Shaw, and the two of them became Germantown traditions, living a life of dedication to their hospitals.

Occasional solitude, fishing from his canoe at sunrise, gave him a chance to remain close to nature in his beloved Maine. His single-minded pursuit of truth was well known, and his considered advice, be it medical or otherwise, was invariable heeded and usually followed. The abundance of personal integrity that was basic with him cannot be measured. With his unassuming manner, almost shyness, and his deep humility, he was an example for all to emulate.

Some of the hundreds of messages of condolence at his death describe Ralph Mays well: he was "a true gentleman — a gentle man — we have lost an irreplaceable friend — most fortunate are we upon whom some small part of his life rubbed off."

Memoir of Thomas M. McMillan, Jr. (1892-1976)

By JOSEPH B. VANDER VEER, M.D.

Thomas M. McMillan, Jr., died on October 17, 1976, at the age of 84, in his native and beloved Mobile, Alabama. He had returned there in 1964 after a long life of devoted professional service in Philadelphia. He had been a member of the College of Physicians for fifty-two years.

Tom was born in Mobile on January 27, 1892. His father has served as a youngster in the Confederate Army and was self-educated. After the war he had entered the lumber business, running a sawmill and later acquiring large tracts of farm and forest land. He had a country plantation in Stockton, Alabama, where the family spent many happy vacations. Tom's mother was an outstanding woman and a very progressive person in the community. She was one of the first women to graduate from college, started the first library in Mobile, and was a leader in the cause of education for Negroes. From her Tom received early religious training and exposure to the classics.

Tom attended Mr. Wright's Military School in Mobile where he played on the baseball team. He played the violin and showed an early interest in religious things, a preview of what was later to become an important part of his professional and social life. An older brother became a Presbyterian minister. Tom attended Princeton where he received an A.B. degree in 1913, having been vice-president of his class and manager of the track team. He was voted the most popular man of his class, and was later awarded the class cup and cited for embodying the highest ideals of his profession. He graduated from the University of Pennsylvania School of Medicine in 1917, immediately joined the Army Medical Corps as a first lieutenant, and served for two years, including an overseas assignment in France.

On his return to civilian life he spent two years doing special work at the Hospital of the University of Pennsylvania and the Philadelphia General Hospital. While in the army he had considered careers in surgery or radiology, but in his hospital experience he was greatly influenced by Alfred Stengel and Edward Krumbhaar. The latter was one of the first physicians in this country to use the string galvanometer and had published his first paper in that field as early as 1916. He was engaged in functional and pathological studies on the heart at this time. Krumbhaar was later to become a life-long benefactor of the College of Physicians of Philadelphia and to serve as its president from 1940 to 1943. With this influence, young Tom McMillan decided on the field of medicine and spent nearly a year in London working in cardiology and physiology with Sir Thomas Lewis and E. H. Starling.

On his return to this country he began a career of hospital practice, teaching, and editorships, seldom equalled in our profession. In 1923 he was appointed an assistant physician to the Pennsylvania Hospital and in 1932 he became physician and chief of the Out-Patient Department. In 1946 he was made head of the Department of Internal Medicine and consultant cardiologist to the Pennsylvania Hospital. He served in the Division of Cardiology at the Philadelphia General Hospital beginning in 1932 and was chief of this division for many years. He was cardiologist and later consultant cardiologist to the Burlington

County (N.J.) Memorial Hospital. He served as a chief consultant in cardiology to the Veterans Administration for many years. With William D. Stroud and others he was active in the late 1920s in the formation of the Philadelphia Heart Association, one of the first associations of its kind, later to become affiliated with the American Heart Association as the Heart Association of Southeastern Pennsylvania. He served as its president from 1941 to 1944. He was active in the Pennsylvania State Heart Association, serving as a Director and as a memberof many committees. He was one of the founders of the Children's Heart Hospital.

Tom was a master bedside teacher; his gentle, friendly manner in discussing patients' problems on rounds was an example to all. Hundreds of medical and post-graduate students received a practical, working knowledge of the new and important field of electrocardiography from his outstanding lectures, given patiently year after year, which always included the newest information on this rapidly growing subject. In 1946, despite his many duties, he accepted the editorship of the *American Heart Journal,* then the official journal of the American Heart Association. He was so successful in this post that in 1950, when the Heart Association decided to launch a new official journal, *Circulation* representing its broadening interest from the heart to the entire circulation, no one else was even considered as editor. He held this position for five years, and at the termination of his editorship a special issue of *Circulation* was dedicated to him. He was a director of the American Heart Association for many years and received the Gold Heart Award of that Association in 1955.

Tom was active in the American College of Physicians, serving as Governor for Eastern Pennsylvania from 1949 to 1958 and as chairman of the Committee on Post Graduate Courses from 1949 to 1953. He was honored by the College with the Alfred Stengel Award in 1954 and a Mastership in 1964. He was a regent of the College from 1960 to 1964, and was a vice president. When it was decided to publish a bulletin for the College, he was chosen as its editor; he served in this capacity from 1960 to 1964.

With all of these professional duties Tom found time for his family and for many interests outside of medicine. He was a member of the session of the First Presbyterian Church of Philadelphia for many years, and a trustee of the Princeton Theological Seminary from 1948 to 1967. He also served as a trustee of Lincoln University.

On his return to Mobile in 1964 he did not practice medicine but his interest in medical affairs did not wane. He was an honorary consultant in cardiology to the Mobile General Hospital and an honorary member of the Alabama Medical Society. He was active in the formation of the new Medical School of South Alabama. He attended rounds at the Hospital of the Medical School, the Providence Hospital, and the Mobile Infirmary. A physician many years his junior said "he was well known, respected, and admired by all of the Medical community." He was an active member of the Board of the City Museum of Mobile.

He was a great student of history and an admirer of Robert E. Lee, and had acquired many of Lee's personal effects. He had an extensive collection of letters and manuscripts related to the early history of the city of Mobile, from colonial Mobile under the French through the Revolution and up through Civil War times, which he left to the City Museum of Mobile.

Thomas McMillan married Julia Talcott of New York City in 1919. They had become acquainted during many visits to her relatives in Mobile. This lovely, gracious lady, who survives him, was his lifelong companion and ever present helper. There are three children

from this devoted marriage, Thomas M. McMillan, III, a physician and cardiologist in Mt. Holly, New Jersey, Frances T. Russell (married to a physician), and Mrs. Julia L. Turnbull. There are nine grandchildren.

Harold M. Marvin, a close friend who followed Tom as the editor of *Circulation,* wrote in his preface to the special edition of the journal dedicated to him: "The first ten volumes of this journal will stand as a lasting monument to his ability and his consecration to the work that he loved. But he has created something else which even though invisible and intangible, he may regard as much greater: the respect, admiration, and abiding affection of all who have been privileged to know him. His students, associates, and friends are agreed that few indeed have been blessed with such a rare combination of qualities: intelligence and understanding, complete sincerity, patience and tolerance, an unfailing gentleness rarely encountered in men, a sweet and happy disposition. The years in Philadelphia have taken away none of the consideration for others or the charming graciousness that he brought from his Alabama home. His inability to think or speak harshly of anyone has been an inspiration to those who recognize it as strength, not weakness, as another manifestation of a warm and lovable personality."

Thomas McMillan will long be remembered as a refined, sensitive, cultured gentlemen. His influence lives on in his many friends and former students.

Memoir of Solomon S. Mintz (1913-1977)

By LEON CANDER, M.D.

Solomon S. Mintz, who was elected to a Fellowship in the College of Physicians of Philadelphia in 1952, died on February 26, 1977, in his 64th year. Graduation from Hahnemann Medical College in 1941 was followed by internship at Frankford Hospital. As was common practice at the time, a residency in internal medicine was preceded by a year of pathology residency at the Mt. Sinai Hospital in Philadelphia (now the Daroff Division of the Albert Einstein Medical Center). Outstanding performance as a chief resident was rewarded by a fellowship in cardiology under Louis Katz at Michael Reese Hospital in Chicago. Upon completion of the fellowship, he returned to Philadelphia to practice cardiology as a member of the staff of the Mt. Sinai Hospital, his primary institutional affiliation until his final illness. Throughout a career of 32 years he served that institution as director of medical education, director of postgraduate education and finally as acting chairman of the Department of Medicine. While he was active as a respected teacher of medical students and house staff at Mt. Sinai, at various times he also held faculty appointments at the Medical College of Pennsylvania, Hahnemann Medical College, and finally as clinical associate professor of medicine at Jefferson Medical College. He was also on the medical staffs of Rolling Hill Hospital, Graduate Hospital and the Northern Division of the Albert Einstein Medical Center. He was certified by the American Board of Internal Medicine and the subspecialty Board of Cardiovascular Disease.

In addition to being a Fellow of the College of Physicians of Philadelphia, he was a member of the American Medical Association, Pennsylvania Medical Society, Philadelphia County Medical Society, American Heart Association, American Federation for Clinical Research, American Association for the Advancement of Science, New York Academy of Sciences and the American College of Cardiology.

A skilled clinician, Sol exemplified the finest attributes of the selfless, unpretentious, dedicated, scientific healer. Former students and colleagues are joined by unanimous admiration of his lifelong devotion to the care of the patient. Perhaps the universal affection and respect enjoyed by Sol will be a source of comfort to his gracious wife, Bea, and his son, Dr. Richard, and daughter, Robin.

Memoir of Maurice R. Nance (1915-1976)

By JOHN KAPP CLARK, M.D.

When Maurice R. Nance, M.D., known to his friends as "Pete," died at his home on Christmas Eve 1976 at the age of 61, a distinguished medical career, equalled by few, came to an end. At the time of his death, he was vice president and medical director of Smith Kline & French Laboratories, a post from which he had exerted leadership in pharmaceutical medicine for many years, having joined the company as a clinical investigator in 1948.

A Virginian, born in Norfolk, Pete received his B.S. degree from the College of William and Mary in 1937 and his M.D. from the Medical College of Virginia in 1941. He interned at the Bryn Mawr Hospital in 1941-42. During World War II, Dr. Nance served as a major with the Army Medical Corps in the European Theater. He was awarded a Bronze Star and participated in the Battles of Normandy and Ardennes. After the war Pete finished his training in pathology at Bryn Mawr and was in private practice in Wynnewood until 1955.

During his career at Smith Kline & French, he was responsible for the introduction of many new agents into medical practice, including alpha-adrenergic blockers, coronary dilators, and ion exchange resins. He played an important role in the American development of chlorpromazine (Thorazine), the first major therapeutic breakthrough in psychiatry for many years. In these activities, he had the rare ability to talk sense to a wide range of people from laboratory scientists to business executives, and was widely respected for his knowledge, experience, integrity, and good judgment.

As pharmaceutical medicine became increasingly embroiled in regulatory affairs, Pete met the challenge with characteristic effectiveness. He was one of the founders of the Greater Philadelphia Committee for Medical-Pharmaceutical Sciences under the auspices of The College of Physicians of Philadelphia, of which he was a Fellow. At the time of the shock of the discovery that thalidomide induced phocomelia, Pete served with the Commission on Drug Safety, a group of distinguished industrial and academic scientists charged with formulating recommendations for appropriate drug testing. He served as chairman of the Medical Section of the Pharmaceutical Manufacturers Assocation in 1963-64, and was a member of the President's Science Advisory Committee, Panel on Handling Toxicological Information, from 1964 to 1965. He was also a member of the White House Conference on Health in 1965.

Pete was a good friend and a delightful gentleman whose warmth and wit added to any gathering. A devoted family man, he is survived by his wife, the former Frances Garrard Essick; a son, Peter M., of Kentfield, California; a daughter, Mary Virginia; his mother, Mrs. Mary V. Nance of Norfolk, Virginia; and a granddaughter. The beautiful memorial service at the Overbrook Presbyterian Church was an impressive tribute to the esteem in which Pete was held by many. His death brings us all a sense of loss and sorrow but the feeling that we are better for having known him.

Memoir of Fred MacDonald Richardson (1909-1976)

By E. WAYNE MARSHALL, M.D.

Fred MacDonald Richardson was born on October 30, 1909, in Bellows Falls, Vermont, and grew up in Haddonfield, New Jersey. He attended Haverford College, where his athletic prowess soon became apparent with his high-jumping skill. While at Haverford he met Margaret Ullom, a Bryn Mawr College student, whom he eventually married. This relationship had a great effect on Dr. Richardson's life, since Margaret's father, Dr. Josephus Ullom, was a beloved family practitioner in Germantown.

Following his graduation from Haverford College in 1931, Dr. Richardson attended Jefferson Medical College. During the summers of his medical school years he had a job as a life guard at the municipal pool at the old Woodside Amusement Park. In a league of water polo teams, he was considered Woodside's star player. He completed his medical education by interning at Methodist Episcopal Hospital in Philadelphia from 1935 to 1936.

Following his internship he joined Dr. Ullom in Germantown in a family practice. It was during these years of practice with his father-in-law that Dr. Richardson learned the importance of good doctor-patient relationships.

Dr. Richardson took care of the night calls with zest and enthusiasm. Mrs. Richardson recalls one occasion where he had to drive from their home in Mt. Airy to a midcity apartment on the Parkway. It was a slippery, icy night, and he had hardly departed from his house when she received a phone call from the apartment house doctor saying that the man had passed away. Mrs. Richardson immediately phoned the Park Guard Headquarters on Wissahickon Drive and asked them to stop Dr. Richardson so that he could return home. A little later the phone rang again; it was Fred Richardson cheerfully reporting that he had made it to town, but the man had died. Mrs. Richardson expressed her surprise and explained about the park guards, to which he replied, "Oh, that's what they were waving at me for!"

On another hurried midnight call to a coronary patient he was stopped by the police, shooting their guns in the air. They insisted on accompanying him, and one of them actually rode with him. Apparently they were skeptical about this medical emergency, until they reached the destination and saw the patient and heard the family saying "Thank God, Doctor, you've come," whereupon the police became very helpful.

Soon after Dr. Richardson started practice he became active on the staff of Pennsylvania Hospital. It was not an uncommon sight to see him drive an ill patient to the Pennsylvania Hospital in his vintage Volkswagen. As the signs of war began to develop, Dr. Richardson enrolled in the Pennsylvania Hospital Medical Unit, and in addition joined the Reserves. In April of 1941 he was ordered to duty at the Stark General Hospital in Charleston, South Carolina. He had hoped to join the Pennsylvania Hospital Unit, but he was given several months duty at the Mayo Clinic. He then became attached to a small hospital unit and left on the first trip of the Queen Mary as a troop carrier. After thirty-five days on board they arrived in Australia.

Dr. Richardson took with him the "falling

drop" method for rapid hemoglobin determination. This was of great interest to the local Australian Army Hospital because they were anticipating a possible invasion by the Japanese. At their request, Dr. Richardson was loaned to the local hospital for a period of time.

Dr. Richardson was promoted to captain, but he was never afraid to tell his superiors that "we don't do it that way at Pennsylvania Hospital." After a period of time he was shipped off to the Philippines as a battalion surgeon. There he made several landings and went out on a number of patrols to bring in the wounded. After three and one-half years of service overseas he was brought home just in time for the celebration of his wedding anniversary and VJ Day.

Shortly after his return Dr. Richardson decided to improve his knowledge of pulmonary diseases, and he joined the Pulmonary Department of the Philadelphia General Hospital. Our chief, Dr. David A. Cooper, held weekly teaching conferences which were usually lively with graduate students, Dr. Leon Collins and Dr. Katharine Boucot Sturgis participating. He also joined the Pulmonary Department of the Pennsylvania Hospital and took an active part in the weekly chest clinic.

After the war he resumed his practice in general medicine and participated in the ward rounds and teaching of medical students. His approach to the patient was one of warm concern, and he was constantly questioning and inquiring into the effectiveness of the treatment and asking why did they get sick, why did they have these symptoms, and why is the treatment effective or noneffective. It was during this period that he was appointed director of the Division of General Practice at the Pennsylvania Hospital.

Dr. Richardson served as physician at the *Evening and Sunday Bulletin* in Philadelphia for over ten years. He not only treated with skill and compassion the ill and injured; he would send back to work, with his ears burning from Fred's often unprintable language, the malingerer who was trying to sneak an extra day off with pay by feigning illness. The malingerer not only accepted his stinging remarks, but also respected him for his honesty. No member of the *Bulletin* staff was more highly regarded and had more friends in the organization than Dr. Richardson.

Underneath his brusque front, Fred was a kindly man. He was especially interested in and considerate of young people. He would go out of his way to listen to a young person who was interested in a medical career. He would sometimes take the young people with him on his ward rounds at Pennsylvania Hospital and show them the interesting parts of each department at the hospital.

Fred was an enthusiastic target archer and was one of the best. He was a member of the United Bowmen of Philadelphia, the oldest archery club in the world. He served the club as its president and as chairman of the annual awards dinner at which the various trophies won throughout the year were presented to the winners. He presided over the dinners with gruff humor and awarded most of the trophies to himself. In archery, as with everything else, the two sides of Dr. Fred Richardson were apparent. He could be caustic to someone doing poorly on his target, but he could also be a good and patient coach.

About 1955 Dr. Richardson became increasingly concerned about the general lack of medical knowledge and the need for the improvement of the quality of medical care. He devoted the next ten years to continuing medical education at the Pennsylvania Hospital. His enthusiasm helped to produce grants from the Hartford and Kynett Foundations, and with these, along with funds from other sources, the Pennsylvania Hospital Post-Graduate Education Program

was established. Dr. Richardson developed a radio network through short wave radio channels of station WHYY, with some fifteen hospitals in Pennsylvania, New Jersey, Delaware, Ohio, New York, Vermont, and Massachusetts participating in several programs a week. Two-way radio telephone hookups permitted quizzing of the lecturer and helped to bring modern medicine to the staff of a number of rural hospitals. Each program began and ended with the sounds that were dear to Dr. Richardson's Scottish heart, the skirl of bagpipe music. Dr. Richardson also set up programs, conferences, and consultations for another outlying hospital.

In 1966 Dr. Richardson left Philadelphia and joined the New York State Department of Health to direct its Bureau of Medical Review. He served simultaneously as research director of the Empire State Medical, Scientific and Educational Foundation, in which the Medical Society of the State of New York joined the state in pioneering development of methods to measure the quality of medical care, principally in hospitals.

During his nearly ten years in these studies, his outstanding contribution was the development of methods for identifying factors that would be sensitive indices of quality care in surgery, internal medicine, obstetrics and pediatrics. These methods enable non-medical abstracting from records for computerized analysis, which will provide information on selective critical matters for review by physicians responsible for supervision of care in their hospitals. This process helps them pinpoint management and educational priorities for continuing education and improvement of medical care quality. Dr. Richardson's work is nationally recognized and has been an important influence in widespread development of the quality assurance programs of today. Two of his recent papers were entitled "Peer Review of Medical Care" and "Methodological Development of a System of Medical Audit."

Dr. Richardson's primary interest was scientific, outstanding, and loving care for his patients. At times he could be frustratingly irascible, at others thoughtful and kind. He was a hard worker and a sincere and good man. Above all, he was a good friend and beloved by those who knew him well enough to know the real Fred Richardson.

It brought sadness to many people when the life of this good friend and physician was brought to an untimely end by a lung cancer. He fought hard to the very end.

He is survived by his wife, Margaret Ullom Richardson, three daughters, and five grandchildren.

Memoir of George P. Rouse, Jr. (1911-1977)

By FERDINAND FETTER, M.D.

George Park Rouse, Jr., M.D., a Fellow of the College of Physicians of Philadelphia since 1951, died at his home in Gladwyne, Pennsylvania, on February 7, 1977, at the age of sixty-five years. He was born in Smithfield, Virginia, on October 22, 1911. He moved to Ridley Park, Pennsylvania, as a young boy and was graduated from Ridley Park High School in 1929, from Amherst College, where he was a member of Psi Upsilon Fraternity, in 1933, and from Cornell University Medical College, where he was a member of Nu Sigma Nu Fraternity, in 1937. He interned at Presbyterian Hospital in Philadelphia from 1937 to 1939. From his internship he went directly onto the Medical Staff of Presbyterian Hospital as assistant physician, later serving as associate physician, and from 1954 on as Chief of the Metabolic Service of that hospital. He also served a term as president of the Medical Staff. Although Presbyterian Hospital was his primary interest, he was also associate physician at the Graduate Hospital of the University of Pennsylvania and consultant at the Roxborough Memorial Hospital in Philadelphia. He was assistant clinical professor of medicine at the Medical School of the University of Pennsylvania, and associate in medicine at the Graduate Medical School of the University of Pennsylvania.

He was certified by the American Board of Internal Medicine and was a Fellow of the American College of Physicians, and a member of the International College of Physicians, the American Diabetes Association, the J. Aitken Meigs Society, of which he was Past President, the American Medical Association, the Pennsylvania Medical Society, the Philadelphia County Medical Society, and the Medical Club of Delaware County. His special interest was diabetes mellitus, and he contributed articles, mainly on this subject, to the *Cyclopedia of Medicine* between 1942 and 1961.

He was married in 1941 to Elizabeth L. Chandler. He was a devoted family man and a good father to his two children, George Parke Rouse, 3rd, and Anne M. McDowell. His wife and children survive him.

He was gregarious and enjoyed life and people. He was a member of the Union League of Philadelphia, the Merion Golf Club, the Seaview Country Club, the Ocean City Yacht Club, the Virginia Society Sons of the American Revolution, the Historical Society of Pennsylvania, and the University Lodge #610 F. and A.M.

A moving and touching memorial service was held at the Bryn Mawr Presbyterian Church on February 10, 1977. Dr. Rouse will be greatly missed by his many patients, friends, and colleagues.

Memoir of Joseph Evans Sands (1895-1977)

By JOSEPH A. WAGNER, M.D.

It was with deep regret that we learned of the death of Dr. Joseph E. Sands on Monday, January 31, 1977, at the age of 81.

Dr. Sands resided and practiced medicine in Rosemont, Pennsylvania, until he moved to Stone Harbor, his summer home, in 1962. In Stone Harbor he again "hung out his shingle" and practiced there until one week before his death. Elected a Resident Fellow of the College of Physicians of Philadelphia in 1936, Dr. Sands' forty-one years of Fellowship covered half his life span.

He was born in Clarkesburg, West Virginia, and was graduated from Swarthmore College and the University of Pennsylvania School of Medicine. He interned at both Pennsylvania Hospital and the Children's Hospital in Philadelphia. He could not decide on a career in either pediatrics or obstetrics, but enjoyed a general practice for nearly 56 years.

While active on the Main Line, he was a member of the Lower Merion School Board and a director of the Main Line Health and Civic Association; he also served as physician to the Dunwoody Home in Newtown Square from its inception until he moved to Stone Harbor in 1962.

Dr. Sands was a member of the Merion Cricket Club and, at the time of his death, was also a member of the Stone Harbor Yacht Club. He is remembered by all who knew him as a most capable and compassionate physician, loved by his many friends and patients.

Memoir of Jacob H. Vastine, 2nd (1897-1976)

By KATHARINE R. STURGIS, M.D.

Jacob Hursh Vastine, 2nd, was born on April 3, 1897, at Catawissa, Pennsylvania, the son of George Hughes Vastine, M.D., and Nellie Pfahler Vastine. Dr. Vastine's maternal grandfather and Dr. George L. Pfahler were cousins. On his paternal side, Dr. Vastine was the grandson of Jacob Hursh Vastine, M.D., who graduated from Jefferson Medical College in 1856 and then served as surgeon during the Civil War. Dr. Vastine's background was rich in medicine. There were almost forty physicians in his family and that of his wife, whose maiden name was Frances B. Anderson.

A graduate of Bloomsburg State Normal School in 1914, Dr. Vastine studied engineering for the next three years at Cornell, after which he entered the service, then matriculated at the School of Medicine of the University of Pennsylvania, receiving his M.D. in 1923. He interned at Easton Hospital, did general practice for a year in Berwick, then took a residency in radiology at Peter Bent Brigham Hospital under Merrill C. Sossman in the days of Cushing and Christian. It was natural, close to his illustrious radiologist-relative, George Pfahler, and with an engineering background, that Dr. Vastine went into radiology. He was a diplomate of the American Board of Radiology and became lecturer in Radiology at Woman's Medical College in 1926 and professor of radiology in 1929, a post in which he served with distinction and charm until he became emeritus professor in 1962.

He was an excellent teacher and clinician. He loved people and he loved radiology, setting a great example for students. In those earlier days, radiation therapy and diagnostic radiology were combined. Dr. Vastine's perpetual optimism was a bulwark for cancer patients. He was never too busy to be helpful.

When I ran the huge official municipal chest x-ray surveys, I would occasionally encounter a patient about whom I was dubious as to whether or not there was a real problem. The Central X-ray Unit was not far from Dr. Vastine's private office at the Medical Arts Building. I could call him and explain the problem, and he would always say: "Kitty, send him over. I'll take a look at him and call you back." I would receive sound advice from Dr. Vastine and warm appreciation from referred patients who had been charged nothing if Dr. Vastine felt they were indigent or five dollars, as a gesture, if he thought they could pay.

Dr. Vastine was also associate professor of radiology at the Graduate School of Medicine of the University of Pennsylvania from 1932 to 1960. He was chief of radiology at Woman's Medical College Hospital, at St. Christopher's Hospital from 1934 to 1948, at Presbyterian Hospital from 1938 to 1948, and at Eastern Pennsylvania Psychiatric Hospital from 1956 to 1974, practicing his specialty up to two years before he died.

A Fellow of the American College of Radiology and of the College of Physicians of Philadelphia, Dr. Vastine also served as president of the Philadelphia Roentgen Ray Society, the Medical Club of Philadelphia, and the West Branch of the Philadelphia County Medical Society. His devotion to the College of Physicians of Philadelphia, to which he was elected in 1933, was evidenced

by his service as treasurer from 1955 to 1962 and by his having become an S. Weir Mitchell Associate.

Dr. Vastine always participated actively. He was his class agent at Penn from 1952 to 1962, served on the Board of the Philadelphia Tuberculosis and Health Association, and was a member of the Philadelphia, Pennsylvania, and American Medical Associations as well as the American Roentgen Ray Society, the Radiological Society of North America, and the Laennec Society. He received a Distinguished Senior Alumnus Award in May of 1973 from the University of Pennsylvania School of Medicine.

Dr. Vastine was the author of thirty-six scientific articles. His wife told me that once they had more than two hundred white mice in their home which he had injected with cancer cells!

Dr. Vastine really believed in careers for women, especially for women physicians. His chief associate in radiology at Woman's Medical College for years was his second cousin, delightful Mary Frances Vastine. Another woman radiologist in his department had waited a long time for her first baby, and could hardly bear to leave the infant when she returned to the College. Dr. Vastine gave her a small, sunny, radiation-proof room in which the baby could sleep safely; the radiologist-mother could slip in frequently to feed or change her little son until she could feel comfortable about leaving him at home.

Dr. Vastine built up those with whom he came in contact. I never heard him make a derogatory remark about anyone. If a colleague made such a comment, Dr. Vastine unobtrusively changed the subject. He was certainly not saccharine, but just basically kind. He was active in All Saints' Episcopal Church of Wynnewood.

Dr. Vastine's hobbies were photography and painting. He stopped painting during the height of his professional activities, resuming it when he retired. But he made good use of his photography. He took Julia Washington into his private office and trained her to develop the most beautiful films. These were the days before such things were done automatically. Dr. Vastine was enthusiastic and up-to-date about innovations. He was the first person I knew to have a color television set.

He was full of fun. When the Martha Tracy Wing was built to house the Department of Preventive Medicine, it was adjacent to radiology so Dr. Vastine entered the hospital through our department. On the frequent occasions when I encountered him en route, my day was always brightened by a funny story, or, at least, a great warm smile.

Dr. Vastine was loyal. He loved his mother through her aging and infirmity. She lived to be 98 and he visited her every day. We all thought Dr. Vastine too would live into his nineties, but he suffered a stroke in April of 1974. While he seemed to make a good recovery, he had a second episode and died at age 78 on March 28, 1976.

No one enjoyed life more than Jacob Vastine. He loved golf and bridge, which he played at his clubs — the Merion Cricket, Merion Golf, Philadelphia Country, Rittenhouse, and Hamilton Bridge Club. He was a Mason, Catawissa Lodge, and a member of the Phi Sigma Kappa.

Frances and Jacob Vastine had three children and eleven grandchildren — three granddaughters and eight grandsons — one of whom, J. Grant McCabe IV, will receive his M.D. from the University of Virginia this year. Their daughters are Mrs. J. Grant McCabe III and Mrs. Jane V. Leibfried. Their son, Jacob H., 3rd is a vice-president of the Fidelity Bank.

Something utterly lovely went out of Philadelphia Medicine with the passing of the gentle, happy spirit of our Fellow, Jacob H. Vastine, 2nd.

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A Study of the Relationship Between Psychological Defenses and Endocrine Function in a Patient with Cardiovascular Disease*

By WILLIAM R. DUBIN, M.D.†

One of the interesting areas of psychiatry is the relationship between psychological defenses and the physiological functioning of the human body. The "mind-body" dichotomy has intrigued scientists for centuries, but it is only within the last quarter of a century that researchers have developed techniques which have allowed them to begin to explore this question. Because of the availability of biochemical assays, investigators have been able to establish that certain endocrine organs respond to psychological stress. One of the more extensively studied endocrine systems has been the adrenal gland, which consists of two functional parts — the adrenal medulla and the adrenal cortex. Researchers have shown that during periods of mental stress the adrenal medulla releases epinephrine and norepinephrine, which influence the cardiovascular system by raising blood pressure and increasing cardiac output. This paper will present a case history which highlights the relationship between psychological stress and cardiovascular response. The author will propose a hypothesis to explain the etiology of the patient's problem and then will review the literature that has reported a relationship between psychological stress, endocrine function, and cardiovascular function. Finally, the author will discuss the implication that his hypothesis might have for psychosomatic medicine.

CASE HISTORY

The patient (Mr. W.) is a man in his mid-forties who was brought to the hospital following a cardiac arrest. His past medical history had been unremarkable until two years prior to this current admission, when he had suffered a diaphragmatic myocardial infarction. He was hospitalized in his community hospital, where his course was uneventful. During the next two years Mr. W. was maintained on isosorbide dinitrate, quinidine, and chlordiazepoxide, under the supervision of his family doctor. The patient noted that during this time he occasionally experienced anginal-type pain and ectopic beats which caused him much anxiety, but he was otherwise medically asymptomatic.

On admission to the hospital, Mr. W. was semi-comatose and had a regular tachycardia (160 beats per

*Kenneth Appel Award Lecture, 1977.

†Box 269, Thomas Jefferson University Hospital, Philadelphia, Pa. 19107.

minute), which was thought to be either a supraventricular tachycardia with aberrant conduction or a ventricular tachycardia. Over the next 48 hours the tachycardia continued unresponsive to cardioversion or intravenous injections of lidocaine. The rate gradually decreased to 110-120 beats per minute. His physicians then felt that he had a sinus tachycardia, which was finally controlled four days after admission. The patient remained semi-comatose for four days and when he finally awoke had no memory of the preceding five days. Stomach lavage on admission revealed undigested capsules in the gastric contents. Analysis by the poison control center was negative for barbiturates or other sedative-hypnotic drugs. Further medical evaluation was unable to explain the cause of his cardiac arrest. EKG tracings were normal. Enzyme levels were slightly elevated, but this was felt to be the result of his semi-comatose state. There was no evidence of pulmonary emboli. A psychiatric consultation was requested because the gastric contents had raised concern among the house staff about a possible suicide attempt.

On the initial psychiatric examination, the patient presented as a well-built, tall, middle-aged white male in no acute distress. He spoke in a loud, booming voice. He admitted to confusion as to what could have happened to produce his present state. He denied suicidal ideation. There was no evidence of psychosis. He denied any family problems or unusual stresses at work. His affect was cheerful, with no evidence of depression or flatness. His sensorium was intact and his intelligence was normal. The patient was seen two more times and continued to state his confusion as to what had happened and to deny any problems or unusual stresses, emphasizing that he was quite content with his life. An interview was held with the patient and his wife, during which Mrs. W. brought up the topic of their marriage and problems that the patient was having at work. During this interview, while the patient was discussing his marriage and his work, the author noted premature ventricular contractions on Mr. W.'s bedside cardiac monitor which became frequent enough to necessitate termination of the interview. Based on further sessions with the patient and three months of couples therapy with the patient and his wife, the author was able to establish from Mr. W.'s history the probable cause of the cardiac arrest.

Mr. W. was born in a small rural community. He was the second of three children, having an older brother and a younger sister. His father was a craftsman who was described as passive, kind, and easy going. According to the patient, the father left the running of the house to the mother and preferred "to go fishing rather than bother with things around the house." The patient identified with the father, stating "We're very much alike." The mother was the dominant force in the household and was described as aggressive and demanding. She favored the older son and the patient felt that "whatever I did my brother was always more successful than me in my mother's eyes."

The patient felt that he could never please his mother, no matter what he did. He noted that when he was in his early teens, when his brother was having marital difficulties and was going to leave his wife, their mother "got sick" and her doctor said that she was going to die if the brother left his wife. The brother reconciled with his wife, and the mother got better, but the patient vowed that he would never do anything to kill his mother after he saw what his brother's behavior had allegedly done to her.

The patient met his wife in college and proposed marriage after a brief courtship. He stated that "she was pretty and had more class than any woman in my family." His wife appeared during therapy to be a histrionic, childish, and coquettish woman who felt quite threatened by closeness with a man. She typically defended against closeness by a critical, sarcastic attitude. Their sexual life was disrupted by Mr. W.'s history of premature ejaculation throughout the marriage. When the patient and his wife had arguments, Mr. W. would never shout or raise his voice, rather he would walk out of the room or have a martini. Though he was not an alcoholic he would take several drinks when he felt tense and wanted to relax. Mrs. W. reported that "We never have a good argument. He won't say anything."

Mr. W. had been trained as an engineer and had worked in this field for about fifteen years. When the firm that he was working for went out of business, Mr. W. went on unemployment compensation, stating, "I thought that I'd take it easy for a while. I really enjoyed not working for that time." He got a job with a finance company when his unemployment insurance ran out. Because of his capabilities he had been steadily promoted over the last four years; his most recent promotion, two months prior to admission, was to manager of a department in charge of repossession from delinquent accounts. In this position the patient was in charge of ten other men. Though he denied any anxious feelings about this job, his history during these two months since the promotion revealed that he was drinking more during lunch and taking more tranquilizers. The day of the cardiac arrest, Mr. W. was to have his first formal meeting with his staff. He admitted to feeling quite anxious that day and noted having taken three tranquilizers within approximately two hours and having had several drinks during lunch. The last event that was recalled by others, but not by the patient, was of an outburst of anger with loud verbal reprimands and much gesticulating toward one of the men on his staff. Within thirty minutes after this outburst, the patient suffered a cardiac arrest. When the rescue squad arrived they found him pulseless, and had to perform cardiopulmonary resuscitation in order to revive him. He was then brought to the hospital.

INTERPRETATION

This case provides an example of the close relationship between psychological and physiological functioning. In the absence of an organic etiology, the author has formulated a hypothesis of psycho-physiological response based on the intrapersonal dynamics of the patient.

Behind the facade of masculinity and independence, treatment revealed the patient

to be a passive man with many doubts about his own masculinity. Mr. W. dealt with stress by withdrawing from the stressful situation. He used as his main defenses denial, rationalization, intellectualization, isolation of affect, and repression. These defenses helped control his aggressive impulses. His fear of aggression seems to have stemmed from his relationship with his mother, whom he saw as domineering and aggressive. He felt that she was always "putting my father down" and that she favored his older brother. Mr. W. stated that "regardless of how successful I was mother always saw my brother as more successful." According to Mr. W. his brother had never achieved the educational, financial or occupational successes that he had. Though the patient was enraged by his mother's favoritism toward the brother and her treatment of his father, he was afraid to express his anger because he was fearful that if he upset her "she might come close to dying like she did when my brother upset her." Whether the patient was afraid to express his anger because he feared retaliation or whether he felt guilty over his hostile feelings was never clearly established during therapy.

The incident on the job had several anxiety-provoking elements. For the first time he was in a supervisory position. This meeting would be his first demonstration of competence in front of his staff. Historically, his brother was always more competent, while he was a failure in his mother's eyes. The angry outburst toward an employee stirred up conflicts that he had toward his own aggression. Though the reason for the outburst was never established, the conflict at the moment of the outburst appeared to be over sucesss and aggression. The patient had to conduct the meeting or appear incapable in the eyes of his employees. The fear of failure probably made him quite anxious. The angry outburst toward an employee compounded his anxiety as it aroused his conflicts over aggression.

I postulate that the conflicts evoked by the situation at work resulted in overwhelming anxiety which caused an outpouring of epinephrine and norepinephrine. The excess catecholamines caused cardiac arrhythmias which resulted in the cardiac arrest. This line of reasoning suggests the following hypothesis: there is a homeostatic balance between psychological and physiological functioning. When the psychological defenses are overwhelmed by conflict, the homeostatic mechanism of the body is disrupted, hormonal surges occur, and, in predisposed individuals, disruption of organ function follows.

The evidence for such a hypothesis explaining Mr. W.'s cardiac arrest comes from two different areas. One is the field of cardiovascular psychosomatic medicine, in which certain indirect observations such as changes in blood pressure and heart rate have suggested that hormones can have major effects on cardiac function. The other, the field of psychoendocrinology, has demonstrated how various endocrine systems respond to emotional stress. This paper will first review the developments in psychoendocrinology that deal with the response of the adrenal medulla to stress.

STRESS AND ENDOCRINE RESPONSE

The era of psychoendocrinology actually began in the early years of the twentieth century with the work of W. B. Cannon on the sympathetic-adrenal medullary system. Cannon's work[1] established the fact that the adrenal medulla did respond to psychological stress. The next major contribution came in the early 1950s from the work of Hans Selye, who showed that the pituitary-adrenocortical system responds to stress in a unique and non-specific manner.[2] A much earlier study by Selye had suggested that psychological or emotional factors might play

a role in the regulation of pituitary-adrenocortical function.[3] Soon after Selye's reports, methods became available to measure hormones, making possible expansion of the field of psychoendocrinology.

The research in this area developed along several lines. Some researchers looked at stress responses in normal subjects. Levi[4-6] conducted a series of studies of the effects of mental stress on the production of epinephrine and norepinephrine. The subjects viewed films of various content, they did piece work in a factory, working two days for fixed wages and two days for wages based on production, and they sorted steel balls of minutely different sizes. These studies showed that watching agitating, aggressive films increased epinephrine and possibly norepinephrine output, that working for wages based on productivity increased norepinephrine 27% and epinephrine 40% along with concomitant physical complaints, and that in sorting steel balls, individuals with low tolerance for frustration showed an increase in norepinephrine and both low and high tolerance groups showed an increase in epinephrine. The increase was significantly greater in the high tolerance group. The low tolerance group had a lower level of efficiency and showed more disturbed behavior. In a study of hockey players and amateur boxers, Elmadjian *et al.* noted that norepinephrine levels tended to be higher in aggressive, active emotional states, while epinephrine levels tended to be elevated in tense, anxious passive reactions.[7]

Changes in daily life events have also been shown to cause fluctuations in catecholamines. After earlier pilot studies indicated that during the six months prior to myocardial infarctions or sudden cardiac death there was a higher intensity of life changes — conflicts at work, conflicts in the family, change in work hours and conditions, missing work because of illness, change in personal habits or recreation — than during a corresponding earlier period, Theorell *et al.*[8] studied patients who survived myocardial infarctions. They found a significant correlation between mean epinephrine output and the mean level of life change units per week. When no major life changes occurred, catecholamine levels were significantly below the average for the individual subjects.

In a comprehensive review of research done on the sympathetic-adrenal medullary system, Mason[9] reviewed studies evaluating the effects of psychological stress on the excretion of epinephrine and norepinephrine in normal subjects. These included studies of stress associated with airplane flights, athletic competition, gravitational stress situations, motion pictures, mental work, and scholastic examinations. These studies all added to the evidence that psychological stress increases the production of epinephrine and norepinephrine.

Another direction of this research was studying adrenal responses in psychiatric patients under stress. One of the classic studies that attempted to elucidate the relationship between stress, psychological defenses and endocrine secretion was the study of four young schizophrenic patients by Sachar and his co-workers.[10] Sachar divided the course of the schizophrenic reaction into four clinical phases. The first phase was termed acute psychotic turmoil. This phase was characterized by overwhelming anxiety and confusion and a breakdown of the psychological defenses. The second phase was that of psychotic equilibrium and was associated with a decrease of emotional disturbance as psychotic defense mechanisms came into play. The third phase, anaclitic depression, occurred when the patient gave up his psychotic defenses and saw himself "as small, helpless and defective, while others were perceived as powerful." The final phase,

recovery, was associated with a return to the defensive style used prior to the onset of the illness; it allowed the patient to cope with reality without undue distress. Endocrinologically, the first and third phases were marked by an elevation of 17-hydroxycorticosteroids to two to three times the normal value. During the second and fourth phases, both phases of emotional calm, the 17-OHCS level fell to within the normal range. Epinephrine levels followed the same pattern as 17-OHCS, being as high as eight times normal during the turmoil phases. The study indicated that "when the defense pattern, whether it be psychotic or neurotic, is effective in protecting the individual from emotional distress, endocrine distress is minimal." The results were replicated several years later by Sachar *et al.* in another study of four schizophrenic patients.[11]

Curtis and his co-workers[12] measured the levels of epinephrine, norepinephrine and 17-OHCS in various affect states. In disorders of thinking or behavior epinephrine and norepinephrine were elevated, norepinephrine was elevated in depression, corticosteroids were elevated in anxiety states, and in mixed affect states epinephrine and corticosteroids were elevated. He noted that epinephrine and 17-OHCS levels were significantly correlated but not to as great a degree as epinephrine and norepinephrine levels.

The relationship between personality and the excretion of 3-methoxy-4-hydroxy-mandelic acid (VMA), a product of the metabolism of epinephrine, was studied by Davies and Monchaux.[13] They designated moods as pleasant or stimulating, the latter referring mostly to unpleasant moods but also including excitement. They found that obsessional personalities acknowledged more stimulating moods on the hysteroid-obsessional questionnaire, and also tended to excrete more VMA in association with these moods. They concluded that the obsessional personality was more prone to experience unpleasant or stimulating moods and responded physiologically to these moods to a greater degree. Elmadjian also showed increased excretion of norepinephrine following LSD administration in patients with manic-depressive illness or in patients with involutional melancholia.[7]

These studies all seem to support the concept that psychological factors strongly affect catecholamine (epinephrine and norepinephrine) response by way of the sympathetic-adrenal medullary system. The next step in the line of thought would be to question the effects of catecholamine release on various organ systems. This has in fact been done with the cardiovascular system.

CATECHOLAMINE RELEASE AND CARDIAC FUNCTION

Research in psychosomatic cardiovascular medicine took a somewhat different course, but generally paralleled the research in psychoendocrinology. Many studies involved indirect measures of catecholamine release, such as blood pressure, pulse rate, and cardiac output, in relation to various personality types and stress. Other studies looked at patients with cardiovascular illness and their physiological response to various stressful events.

Among the studies that measured the changes of cardiac indices was an early study by Funkenstein[14] in which subjects performed stressful tasks; three patterns of response were distinguished in ballistocardigraphic, heart-rate, and blood-pressure recordings taken simultaneously. One group included subjects who expressed their anger outwardly and whose cardiovascular indices reflected a norepinephrine predominance, i.e., a rise in peripheral resistance, a rise in mean blood pressure, and no change or a slight decrease in cardiac index. Another group directed their

anger inwardly; their cardiovascular indices reflected epinephrine predominance, i.e., increase in cardiac index, decrease in peripheral resistance, a small rise in arterial blood pressure. The final group, designated as "anxious," showed a reponse similar to the "anger inward group."

Postulating the autonomic mechanisms provided a final common pathway for the effects of psychosocial forces on the heart, Wolf[15] studied myocardial infarction patients and a group of randomly selected healthy subjects. He found the former to have greater variability of blood pressure, coronary blood flow, serum cholesterol, uric acid, plasma fibrinogen, and silicone clotting. He postulated a defective homeostatic regulatory system. Wolf also observed coronary care unit patients who responded to the death or cardiac arrest of another patient with anxiety, depression, premonition of death, or morbid dreams. He noted that these patients had concomitant increase of premature ventricular contractions, ventricular tachycardia, blood pressure elevation, hyperventilation, angina attacks, cardiac arrest, and death. His most amazing study predicted accurately the ten out of twenty-three patients who would die, based on their levels of depression, anxiety, and history of frustration in job and family settings.

Several other studies have shown relationships between various mental states and changes in cardiac function. Raab[16] found that mild sensory and mental annoyances such as noise, flickering lights, or mental arithmetic produced significant elevations of plasma cortisol levels paralleled by evidence of cardiac sympathetic stimulation, especially in excitable individuals. Lane[17] delineated certain mental states that could result in anginal pain. He noted that dependency, anger, fear, anxiety, guilt, and sexual temptation could result in onset of anginal pain. The relationship between cardiac hemodynamics and stress in the form of interview was examined by Adsett *et al.*[18] This study showed that occurrence of anger was accompanied by increases in coronary blood flow, systolic and diastolic blood pressure, peripheral resistance, and cardiac output. Concomitant with anxiety was an increase in coronary blood flow, cardiac output, and systolic blood pressure.

Several individual case studies have documented in detail the effects of conflicts in intrapersonal dynamics on cardiac functioning. Marmor and Kert[19] described a patient in whom emotional stress would precipitate attacks of paroxysmal ventricular tachycardia. The patient was a man with a compulsive need to prove his masculinity and deny his passivity, his feelings of inadequacy, and his fears. He had a compulsive need to court danger, and it was during these dangerous moments that he would have attacks of tachycardia. The authors concluded that both fear and anger caused sympathetic stimulation resulting in the tachycardia.

A patient with Stokes-Adams syndrome precipitated by emotional stress was described by Meinhardt and Robinson[20] as a dependent, passive person who withdrew when he had to make a difficult decision. The patient used rationalization, denial, and repression to keep his feelings of extreme anger beneath a submissive exterior. The authors found that anger, fear, and rage usually caused sympathetic physiological change and that when the patient's dependency needs were threatened or threats of loss of a love object occurred, he would not become angry but would develop Stokes-Adams syndrome.

In a more recent article[21] Lown presented the case of a 39-year-old man who had recurrent ventricular fibrillation without any organic basis. On psychiatric evaluation he

was noted to be angry and competitive, with well-controlled aggression. He frequently had violent dreams and had strong moral prohibitions against sex. It was noted that within the six months prior to admission he had suffered career setbacks, his wife was suffering from depression over the death of her father, and the children were now adolescents and spending much of their time outside of the family. While in the hospital he was found to have an increase in ventricular premature beats related to visits by the psychiatrist and a substantial increase of premature beats during REM sleep; on occasions when he was beginning to exhibit advanced grades of arrhythmias, he was able to abolish them through the use of meditation. Finally, it was also observed that when he was taking phenytoin and digoxin the premature beats were abolished except during periods of psychologic stress, in which the stress apparently overcame the drug effects.

Other studies which suggest a relationship between heart disease, emotional stress, and catecholamine release include Norvlin's study[22] of patients who had nocturnal angina while dreaming and Nestel's study[23] which found that subjects with angina pectoris show a heightened sympathetic response. He demonstrated that this was true of patients with coronary heart disease as compared to subjects who had non-anginal left-sided chest pain and subjects who had no chest pain.

Raab[24] noted that "a review of present day knowledge warrants the definite conclusion that emotional and sensory stress factors are directly responsible as contributory, if not exclusive causative elements in such myocardial abnormalities as tachycardia, various arrhythmias, electrocardiographic changes of the hypoxic type, anginal attacks, sudden unexpected death, subendocardial disseminated micronecroses, myocardial fibroses and acute or chronic congestive heart failure with or without pulmonary edema." Raab suggests that the endocrine system is the link in these reactions, noting that norepinephrine and epinephrine are released with an increase in myocardial oxygen consumption and that cortisol depletes potassium. Raab[25] further delineated the mechanism of the adrenal release of catecholamines and how this affects the cardiovascular system through increasing cardiac oxygen consumption and secondarily by increasing the mechanical work load of the heart. Reiser, in his recent review of the psychological aspects of cardiovascular disease,[26] remarked that although the specific relationship between affect and physiological patterns of circulatory response is still left open, the research to date does demonstrate that emotion is accompanied by circulatory changes which may greatly increase the amount of work required of the heart.

DISCUSSION

Research in psychoendocrinology has established that under mental stress or conditions in which the psychological defenses are overwhelmed, the sympathetic-adrenal medullary system responds by a release of catecholamines. Some researchers have shown the deleterious effects that catecholamines can have on cardiac function. Still other lines of inquiry have noted through indirect observation that cardiac function is affected during situations of stress. Interestingly enough, to my knowledge, there are very few studies measuring hormonal elevations of cardiac patients in various stressful situations. Yet, the knowledge of endocrine response and its relationship to psychological defenses suggests that perhaps in this relationship lie many of the answers to psychosomatic illness. Does an individual with a genetic predisposition for cardiovascular illness, asthma, or other psychosomatic illness develop these diseases

only after a significant enough stress causes a surge of hormones which trigger a physiological response? An example of this appears to be Mr. W. His cardiac status maintained a satisfactory homeostasis until his psychological defenses became overwhelmed by his conflicts over aggression engendered by his work situation. Having no way out of the situation, Mr. W. responded with heightened anxiety which resulted in a release of catecholamines, and then a near-fatal disruption of his cardiac equilibrium.

Based on this line of thought, a hypothesis for psychosomatic illness might then state that certain individuals have specific organ systems that are genetically predisposed to illness. Under optimum conditions, which include stable psychological defenses, hormonal levels remain within normal limits. If a stress becomes psychologically intolerable, however, and the defenses are overwhelmed by such affect as anxiety, fear or anger, the hormonal level rises and results in illness in the predisposed organ. An example might be an ulcer patient who, under the threat of loss of a significant relationship, has an upsurge of steroids which results in ulcer symptoms or perhaps a hemorrhage. This schema is a simplistic approach, yet it does provide a basis for further research into the area of psychosomatic illness.

One must keep in mind, however, that this paper as well as most research has focused on one endocrine system. The ultimate answer would have to include the complex interaction of responses of all of the endocrine systems. Mason has noted[27] that endocrine systems do not act alone but respond together forming an "over all hormonal balance," He writes that "the state of any given metabolic activity at any given moment must be a function of the total combined hormonal influences acting upon it, i.e., a resultant of the varying balance between multiple cooperating and opposing hormonal influences. The metabolic effects of hormones are dependent, then, not upon the absolute level of any single hormone but rather upon the relative over-all hormonal balance between all participating hormones."

The question of endocrinological response to psychological stress is an old one, yet today's advances in endocrine assays make it possible to pursue this exciting question in a manner not previously possible. The schema of psychosomatic illness that has been proposed in this paper is only a beginning but hopefully will be able to help us gain further understanding of the field of psychosomatic illness.

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Medical Education and the Distribution of Medical Care*

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Medical schools are feeling rather beleaguered and defensive these days. Congress, having diagnosed a number of disorders of our medical care system, has decided that the medical schools should be the instrumentality for applying what Congress has decided is the appropriate therapy. The defensiveness of the schools is reflected in their reaction to the recently enacted Health Manpower legislation. Although the deans unanimously deplored the unconscionable infringement of academic prerogatives that the law involves, they have, nevertheless, declined to seek modification of the law for fear that re-opening of the issues may lead to the enactment of provisions that are even more intrusive upon the responsibilities of universities for running their own affairs. I can understand the reason for taking the latter position if a school feels obliged to accept federal capitation support no matter what the terms. Certainly during the several years that the legislation has been under consideration a number of provisions tentatively included in the legislative proposals would have been far more invasive of academic prerogatives. And Senator Kennedy is known to be unhappy over the fact that some of those failed to survive the Senate-House conference. However, the validity of the concerns over the possible introduction of even more objectionable provisions clearly implies that such provisions will be included when next the act comes up for renewal. Having abandoned the principle of academic freedom and self-determination now, the schools will then find it even harder to resist.

However, I'm straying somewhat from the subject at hand, albeit into one that is currently very much on my mind. The point, however, is that whether or not the schools of medicine are the appropriate instrument for attacking the organizational problems of medical care, Congress has decided to try to use them to that end. I'd now like to go back and consider the nature of the disorders of medical care, some aspects of their etiology, some possible means of treatment and what the responsibility of the medical schools should be.

Some of the symptoms of the disorder are common knowledge. The fact is that doctors are very unevenly distributed geographically. There are large rural and sparsely populated areas scattered through the country where no physicians are in practice. There are three times as many doctors per unit of population in the most favored states as there are in those with the fewest doctors per capita. And even this does not completely reflect the uneven distribution, since within these states the doctors are concentrated in suburban rings around the cities leaving both inner cities and rural areas underserved.

As for the specialty maldistribution, the data here are also well-known. The general practitioner has been progressively disappearing from the scene and has been replaced by a series of specialists. The patient is said to have no one to go to who can deal with all of his problems but is shuttled from one specialist to another, with no one who

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sees him as a whole individual or, even better, as a member of a family. Furthermore, there is little relationship between the distribution of doctors among the various specialties and the real need for the services of those specialists. The commonly cited examples are familiar: there are more neurosurgeons in Massachusetts than in all of the United Kingdom; there are twice as many surgeons per capita in the United States as there are in Great Britain; and there are in the United States twice as many operations per capita. From the latter the conclusion is drawn, not necessarily correctly, that half of the operations in the United States are unnecessary.

Another symptom of the disorder in our system of medical care, one that has not yet been attacked through the schools of medicine, is its enormous cost. I believe that some $130 billion is estimated to have been spent on what is referred to as health care last year. And this was in a time when serious consideration was being given to a system of universal health insurance. Unless some drastic change is imposed upon the system, the introduction of health insurance for all is certain to lead to a further enormous increase in the expenditures for this purpose. Although the costs of health care are not directly responsible for or, I believe, caused by the maldistribution by geography and by specialty, I believe that they do relate in a very important way to the appropriate treatment of the problems and so I bring up the subject at this time.

If we are to find a satisfactory solution to these maldistribution problems it seems to me that we must understand their pathogenesis. In the Congressional view these problems are a simple expression of a modified Sutton's law: doctors locate where they do and engage in the various specialties because that's where the money is. The reasons are, however, more complicated than that. The progressive movement from rural areas and small towns first to the cities and then to the suburban areas is hardly unique to physicians. It is a universal characteristic of modern industrial society. There seems little reason for physicians to behave differently. Furthermore, just as technologic change has drawn the population into regions of increasing concentration, so the technology of medicine has made the physician far more dependent on resources that can be supported only by an adequate population base.

We should recall that only some ten years ago it was thought that greatly increasing the number of physicians was all that was needed to solve the problem of geographic maldistribution. The major expansion of medical school enrollment that has taken place was largely a consequence of this view. Although the effect of this expansion has yet to be fully reflected in the number of physicians in practice, most people now believe — and, I think, correctly — that this is not going to provide relief from the geographic maldistribution problem. Unless some other measures are put into effect, the additional physicians are quite likely to accumulate in the same places where the others already are.

The current plan for dealing with the problem involves use of the National Health Service Corps. In return for scholarship support during their medical school years, relatively recent graduates of medical school are to be assigned to serve the needs of areas designated as short of physicians. I have some doubt as to how well this will answer the problems of the regions that are presently underserved. It seems a good bet that most of the physicians will prefer to be somewhere other than the place to which they will be assigned. If that weren't the case their indenture would be unnecessary. It follows that most will leave their assigned posts as soon as their periods of required service are

completed. There will then be a continuing turnover of short-termers, each of whom accepts the responsibility only reluctantly. Many people might feel that such a physician is better than no medical service at all, but it doesn't seem like a satisfactory long-range answer.

At least as it currently stands, the medical schools have largely been omitted from this process, except that the high cost of medical education provides the incentive for students to sign up for Health Service Scholarships. However, as you probably know it was proposed at one point in the development of the Health Manpower Legislation that it be one of the prerequisites for admission to medical school for all or part of the entering class. Fortunately we have been able to avoid facing a decision as to whether this would be another unacceptable intrusion upon our freedom to set our own admission requirements.

There are two facets to the maldistribution by specialty. One is the distribution among the specialties themselves, the other the distribution between the specialties and primary care. It is probably true that doctors are not rationally distributed among the specialties, that, for example, there are too many surgeons. Indeed it would be a miracle if the supply and the true need were somehow to be matched, given the fact that in our totally uncoordinated system there is no good way of estimating the real requirements for various specialists. This, however, is not what is perceived as the major issue in specialty maldistribution. The great current concern is with what is thought to be a deficit in primary care.

To the extent that physicians for primary care are thought of as general practitioners or under their new designation as family practitioners, there is considerable question as to whether this is what we really need. There are a number of reasons, beyond the change of name, why the general practitioner has been progressively disappearing. I do not think the better remuneration of some of the specialties is important among these reasons. Indeed, some of the best remunerated specialties — for example anesthesiology and therapeutic radiology — have trouble attracting sufficient people. In any case a far more important factor has been the enormous growth of knowledge which has made it nearly impossible to deal competently, by modern standards, with the full range of medical problems. Contrary to widely held opinion, one does not need to know less to be a competent GP than to be a specialist; one needs to know much more. Of course, if it is assumed that the family practitioner only takes care of minor problems and provides assurance to the worried well, referring the more serious problems to the appropriate specialist, then he doesn't have to know so much. In fact, one may wonder whether he then has to be a physician at all. Those are functions that are very well served by physicians' associates or nurse practitioners. Indeed, if this is to be the limited role for these physicians there is no need for the great investment in time and money that currently goes into their education.

I believe that much of the pressure for primary care and family practice are based on the nostalgic illusion that things were better in the good old horse and buggy days when the physician is supposed to have been more sympathetic and attentive. Indeed, I suppose he probably was. It is often overlooked that he had little more than attention and sympathy to offer. Everyone has in mind that famous picture of the physician sitting helplessly, but sympathetically, at the bedside of a sick child. Some of the older among us had that kind of care and attention. I certainly did, and I, for one, would happily exchange it for a brisk business-like physician with an appropriate antibiotic, although a little

understanding and sympathy would indeed be a welcome bonus.

In any case, this is one area in which Congress has given the responsibility to the medical schools, by requiring, as a condition for the receipt of general educational support, that the proportion of affiliated residencies that are devoted to what is defined as primary care be increased over a three year period to at least 50%. Fortunately, internal medicine and pediatrics are accepted as representing primary care. It is difficult to see how this requirement could be met by some schools whose affiliations are largely limited to the primary teaching hospital of a major medical center. Although these hospitals are the ones over whose staffing the schools exert major control, they are also the ones where the maintenance of highly developed specialty programs are essential not only for teaching but also to meet the responsibilities for the tertiary care that such hospitals are expected to provide. Some more fortunate schools have looser affiliations with community hospitals that provide fewer specialty residencies and help to increase the proportion of the school's affiliated residencies devoted to medicine and pediatrics. How schools would fare in trying to eliminate specialty residencies from some of these more loosely affiliated hospitals, should this be necessary to meet the Congressionally mandated standard, remains to be seen. My guess is that some schools will find it difficult to meet the standard and others will do so without great strain. But I suspect that, in the long run, the current legislative requirement will itself have very little real influence on the specialty distribution of physicians.

I believe that there has been a general failure, in Congress and fostered by Congress, to understand the process of undergraduate medical education and the further processes of differentiation that lead, in the post-graduate years, to the distribution of physicians into varying types of practice. This has led Congress, and to some extent the public, to put the blame for the present maldistribution problems, and the responsibility for remedying them, on the medical schools. The misunderstanding concerning the nature of undergraduate medical education and its potential for determining how its graduates will choose to practice is perhaps epitomized in the practice of referring to the medical school experience as "the training of physicians" rather than education for medicine. To me, training carries the connotation of the development of a stereotyped response to a given set of conditions, rather than the development of the ability to gather information, to integrate it, and to determine a reasoned course of action. And some of the measures that have been proposed for medical schools seem to be based on the training rather than the education model. Thus we have had proposals to require students to spend time in so-called remote training sites and in apprenticeship roles. If we want physicians to practice in rural areas, they should be "trained" as medical students in such areas. If they are to take care of ambulatory patients, they should receive their "training" in ambulatory settings. Presumably they will thus acquire the appropriate reflexes for the environment in which they will later function. These pressures seem to me, however, to confuse the role of undergraduate medical education. I believe the latter should be to try to provide as thorough an understanding of the human organism as possible and as comprehensive as possible a view of what can go wrong with that organism. The four years of medical school are none too long for that task and it can be done most efficiently where the resources for investigation and the maximum variety of disorders occur. The university medical center is such a setting. The

development of skills for applying that education in appropriate forms and in appropriate settings belongs in post-graduate education and beyond.

I guess you might say that the responsibility of the medical schools is for the content of medical practice and not for its form. Accordingly, attempts to make the schools the instrument for modifying the form are likely to be highly detrimental to the performance of the schools in their appropriate role and are unlikely to achieve the desired effect.

How then are distributional problems to be solved? I must say that in a totally unrestrained system of medical care I do not believe they will be, and if the restraints added are upon medical education they will not help. A possible answer to the problem may, however, be forthcoming in measures that will be aimed primarily at the economic aspects of medical care. Clearly the mounting costs of medical care are a very serious problem and one that is far more serious than that of maldistribution. The increased technological complexity of medicine that makes it possible to do useful things that could not be done before, the increase in hospital wage scales, and the malpractice situation are, of course, important factors in the increased costs, but I believe that their significance is dwarfed by the consequences of the system of third party reimbursement. This kind of arrangement provides little if any incentive for either patient or physician to keep down costs. The income of physician and hospital is increased by doing more but there is little if any resulting increase in the cost to the patient. Of course in the long run patients as a group, and even doctors, end up paying more in taxes and insurance premiums. But for the individuals involved, the marginal return generally greatly exceeds the marginal cost. It is another example of what Garrett Hardin called "The Tragedy of the Commons." He used the analogy in connection with the problem of population control but it is equally applicable here. He described a situation in which a small community of farmers shares a common pasture. At first each man is free to add cows to his herd without detriment to anyone else because the common pasture provides adequate food for all. However, eventually the capacity of the commons is reached and now each additional cow takes some small amount of food from and reduces the yield of all the other cows. However, it remains in the interest of each individual farmer to add more cows because each one adds to his return something approaching the maximum yield of one cow. It increases his return at some relatively small cost in the return from all of his other cows — and those of everybody else.

This defect seems to me to be inherent in a fee-for-service system with third party reimbursement. We currently are seeing half-hearted and ineffectual attempts to control costs with arbitrarily determined ceilings. These are, I believe, doomed to failure. And the problems will be enormously exacerbated by the introduction of universal insurance, as long as the pattern remains reimbursement of costs incurred for services rendered.

There would appear to be two possible solutions. The first and obvious one would be the creation of a national health service. Whatever might be the virtues and disadvantages of such a service, I do not believe that it will be the direction taken in this country in the foreseeable future. The distrust of government-operated programs is simply too great on the part of nearly everyone.

The alternative would seem to me to be a system in which groups would contract to provide service to defined populations on a prepaid basis. In such a system the incentive to do more would be absent. In fact the incentive would be reversed — the less one

does, the greater will be the reward for the medical group. This would require that the adequacy of the care be carefully monitored, no mean task but one that I suspect would be easier than controlling costs in our present arrangement. Obviously we are not prepared either emotionally or organizationally to adopt such a system in the immediate future, but such a system could be phased in over a scheduled period of years during which there would be increasing rewards for the organization of prepaid groups and disincentives for fee-for-service arrangements. The present provision for so-called Health Maintenance Organizations is totally inadequate, not because the name is the fraud that it is, but because such organizations can not compete on an equal basis with a free choice, fee-for-service system that does not impose a fairly heavy financial penalty upon the patient.

Well, I am not supposed to be talking about the economics of medical care but about the problems of maldistribution. The relevance of the organizational solution of the cost problem lies in the fact that the sort of prepaid group practice system I have described would contain the more or less automatic solution to the maldistribution problems. It would not be in the interest of any group to include in its membership more specialists of any kind than are needed to supply the services necessary for their beneficiaries. The opportunities for various specialists would be strictly limited and it would be possible to project future needs with reasonable reliability. Furthermore it seems safe to assume that most groups would find that efficiency was increased by having most primary contacts through physician associates or nurse practitioners. Specialization among the physicians would in fact be desirable rather than something to be discouraged.

As for the geographic problem, a group serving, on a regional basis, a population large enough to make the center a viable unit could provide the resources and sufficient stimulation and mutual support for the medical people involved to make it a stable organization. A critical feature would be a transportation system that would bring the population of the region within reasonable reach of the center. The transportation system would almost certainly be less expensive than the costs of maintaining physicians scattered among a population too sparse to support them adequately.

These suggestions may seem to be somewhat utopian and to require unrealistically drastic changes in the organization of medical care. The fact is, however, that with national health insurance likely in the near future, without the kind of reorganization I've described we are almost certainly headed for financial problems that will surely precipitate drastic solutions. It would be well to be prepared with some kind of plan.

Medical Education and the Distribution of Physicians*

By CARLETON B. CHAPMAN, M.D.†

What can the American medical school do about geographic and specialty distribution? In reply, I say without hesitation: very little, acting alone. The forces that to date have determined the great increase in specialization and the high concentration of physicians in urban areas — and they are mainly economic forces, although there are others that for want of a better description may be called social — can be neither applied nor withdrawn by the medical schools.

This is the most obvious reply to the question posed for tonight's discussion, and I believe it to be quite true. But I must add that the answer I have provided is incomplete, in that it leaves out of consideration certain subsidiary influences that are hard to quantify but that do possess some reality.

To get at the matter more precisely and, I hope, to provide an adequate base for subsequent discussion, I should like to examine two basic propositions. The first has to do with the manner in which our system for health care delivery influences medical education. The proposition is that the medical schools do not initiate change in health care delivery, but respond to them for the most part. For example, the move toward specialization was not initiated by our medical schools, but their response to it was vigorous enough, especially over the last 30 years. The second is concerned with the medical school's primary instructional and educational obligation up to the point of awarding the M.D. degree. This is much debated. But to my mind that purpose is to turn out a broadly educated but unspecialized physician, and not to start him on a course toward specialization of any sort.

HEALTH CARE DELIVERY AND MEDICAL EDUCATION

But how is our system for health care delivery today influencing medical education? Or, more specifically, is the prospect for change in our health system influencing medical education? The answer is a qualified yes.

The American system for delivery of health care is, relatively speaking, tenaciously laissez-faire when compared, for example, to the British and Swedish systems. The British system, since World War II, has been highly centralized and even collectivized. The fee-for-service principle, while not altogether abolished, is relatively unimportant; most citizens of the U.K. obtain health care at the taxpayers' expense. The Swedish system is, in this regard, a sort of middle way. And there are many other differences that, for the moment, are not germane.

If, however, the health care delivery system governs medical education, we should expect the goals and method of medical education in the three countries to be very different, one from another. But this is not really the case. The goals of medical education, to the point of awarding the qualifying degree, are startlingly similar in the U.S., the U.K., and Sweden, and the methodologic differences between them were, for the most part, in existence long before Sweden and Britain

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introduced their national health services. The proof of the pudding may be in the fact that British, Swedish, and American doctors approach clinical problems in very much the same way. They are, professionally speaking, very much at home with each other and each understands the other's diagnostic and therapeutic approach without much prior explanation. But the same cannot be said of doctors trained in France or Italy, and the differences in approach are considerably more than linguistic. But the point I wish to make is that dramatic changes in health care delivery systems in Britain and in Sweden do not seem to have caused comparably dramatic changes in medical educational method or content, at least not in that portion of medical education that precedes the awarding of the qualifying degree.

But what about post-graduate training, especially at the residency level? Massive differences now emerge, and those differences are indeed directly related to the system within which the fully-trained physicians will one day practice. In Britain, for example, it is said that there is a great emphasis at the postgraduate level on general medicine and ambulatory care, and a corresponding deemphasis on specialty training. This is true in a sense, but it is not an emphasis that originated in Britain's medical schools. A quarter of a century ago, Britain's National Health Service began placing effective limits on the number of specialists who could serve as hospital-based consultants, with the result that opportunities for post-graduate training in the specialties were correspondingly reduced. Those medical graduates who could not obtain specialty training became, for the most part, general practitioners with few or no hospital connections. It is largely through them that British citizens gain access to the health care system, a matter that seems to occasion less difficulty in Britain than in the U.S., especially for low income groups. But in Britain it is almost impossible for a patient to gain direct access, on his own, to tertiary care facilities unless he can afford to seek the counsel of one of Britain's remaining private practitioners.

It is probably fair to say that what we call the *primary care* problem in the United States has not developed in Britain, and very little in Sweden, because of the introduction by legislation of health care systems specifically designed to minimize the access problem. No comparable legislation has been passed in the United States, nor, in my opinion, is such legislation in the immediate offing in our own country, campaign promises notwithstanding.

But we do hear a great deal of complaint about difficulty of access to the health care system in the country, and not all of it comes from units of government. It is voiced in many forms by many groups in and out of government. The possibility that we are overspecialized in this country and that many communities, inner-city and rural, have no doctors at all are causally related to the access problem. Not a few medical schools are attempting to respond by various steps designed to divert students out of the specialties and into primary care or family practice, and funding agencies are designing special grant programs to the same end.

SPECIALIZATION IN THE UNITED STATES

But the move toward specialization continues, and I doubt that it is likely to be reversed, even though the mix of specialty training opportunities is certain to change; indeed, it has already undergone noticeable change. The best evidence in support of this view is the study done by Edithe Levit and colleagues of the National Board of Medical Examiners in 1974. They examined a ten-percent random sampling of American physicians who had obtained their qualifying

degrees in 1960 and 1964. Of the total (1337 in all), ninety per cent had residency training and over seventy per cent completed residency training and had entered the certification process, all this despite the fact that any or all of them could have entered independent practice without any residency training at all. The conclusion that board certification is rapidly becoming a *de facto* requirement for practice in the United States seems fully justified, the more so when we take into account the introduction in 1969 of board certification in general or family practice.

The reasons I do not think these trends are likely to be reversed have mainly to do with income, conditions of practice, and status within the profession. Even so, the obvious and largely undisputed need for effective access of patients to the health care delivery system is likely to cause an increase in the number of physicians seeking certification as family or primary care physicians and a decrease in those entering training for the more traditional specialties.

With this development, the much debated question concerning the training of the primary care physician arises. The assumption is, of course, that a physician and not some other type of health professional should serve as the point of access to the health care system.

WHAT IS A PRIMARY CARE PHYSICIAN?

There is endless debate in the country about primary care, and when agreement as to what a primary care physician really ought to be is so tenuous, it is obviously very difficult to agree as to the training he should have. Be this as it may, by 1975 there were 232 approved family practice residency programs (288 as of July 1976) providing 1684 first-year residency positions, 96 per cent of which were filled. The accent, as well as I can determine, in these programs is on ambulatory care and on the provision of eighty or ninety per cent of family health needs by one specially-trained generalist or family practitioner. But graduates of these programs, no less than the nine thousand or so physicians now certified by the American Board of Family Practice, have no wish to serve solely as ambulatory care physicians, nor have physicians certified by older specialty boards agreed to stay out of ambulatory practice. The division by clinical function is thus much less clearly defined than it is in Britain, although payment policies adopted by third party carriers will undoubtedly have some such effect.

The implications of family or primary practice have, so far, begun to alter the mix of specialty residency training programs but have not influenced pre-M.D. education and training very much. There are, in many schools, clerkships for students that are based on ambulatory care, and some that are based on the care of the family as a unit. But beyond this, medical school curriculums per se have altered very little. The prospective changes in our health care delivery system, with emphasis on easier access, are beginning, beyond any doubt, to affect the post-graduate portion of the medical educational sequence. But more extensive and encompassing changes may lie ahead.

There is only one extensive study, to my knowledge, that seeks to define primary care and to set out comprehensive training programs that are designed to produce such a specialist. That study, by Proger and Williams, seems to regard general practice and primary care as largely synonymous; its definition of a generalist, or primary care physician, is worthy of note. The general practitioner, says the report:

> ...need[s] to comprehend the total range of disease and illness in their ambulatory stages, and to know what special areas of advanced knowledge exist and what treatments are available for the patient. The primary physician specializes in paying attention to the patient at a time the patient expresses a need; in considering the person as a whole as well as the

> illness *per se;* in handling the conditions that can be diagnosed and treated immediately; in delegating to paramedical helpers those tasks appropriate to their abilities; in referring those requiring more specialized diagnosis and treatment to appropriate specialists; and in providing the beginning and end points to comprehensive care, including follow-up or continuing care.

Which is quite a mouthful. But to that Proger and Williams add that the fundamental function of primary physicians is

> ...to provide the population...with an identified point of access...into a medical care system revolving around the well-established resources of community or regional hospitals and university medical centers.

And equally fundamental to the Proger-Williams concept is their view of the primary physician's base of operations — in the inner city it would be in a large urban hospital and in rural areas it would be in the "...nearest community or regional hospital," where the primary physician would have as part of his staff a body of nurse practitioners and physicians' assistants.

The picture, then, is most certainly not that of the nineteenth-century family doctor who saw his patients both in their homes and in his office. If house calls are to be made, the presumption is that they will be made by the physicians' assistant or nurse practitioner reporting, of course, to the primary physician, who, one may assume, would be no more mobile than any other specialist.

As for his training, the prospective primary care physician, according to Proger and Williams, would select his career out of high school and would have two years of college in which most or all the usual premedical requirements would be covered. He would spend four years in medical school, of which the first two years would be devoted to the preclinical sciences and the other two to "intensive traineeship in ambulatory care." Following graduation, the new physician would spend a year in a primary-care center in supervised practice. And that would be it. In this scheme, he would be ready to enter the practice of primary care seven years after graduating from high school.

There are many questions to be raised about such a program. For one thing, the proposal runs in advance of the health care system. We do not possess orderly networks of interrelated peripheral and central health units in the various regions of the country. Nor do our present financing and health insurance practices as yet fit very comfortably into a scheme that is basically ambulatory.

THE MEDICAL SCHOOL OBLIGATION

Much more important are questions relating to the appropriateness of the training sequence recommended by Proger and Williams. For one thing, it is considerably shortened. This in itself may not be wrong. But a very good case can be made for the proposition that the primary care physician requires more, not less, general knowledge of medicine than do other specialists. He must, after all, make the initial distinction between relatively trivial or routine disease and serious ailments that actually threaten the patient's life; and he must make the distinction at a time and under circumstances when difficulties of diagnosis are often maximal. Will the Proger-Williams educational sequence give him this expertise? I suppose it may, but suggest that a more definitive answer is needed before the Proger-Williams scheme is generally accepted.

But however conservatively we may view the shift toward general medicine or primary care, that shift is likely to proceed a good bit further than is now the case, if only because of the need for a better definition of the means by which patients gain entry to the health care system. But the debate over how best to train the primary care physician is just getting started and no one can predict what the conclusions will be.

The matter of the optimal design of the training program for the primary care

physician according to Proger and Williams is beginning to involve the pre-M.D. as well as the post-M.D. phases of the educational sequence. The Proger-Williams model shortens the college phase, but seems to leave the premedical-preclinical science sequence intact. The inference is that the primary care physician needs as sound a grounding in bioscience prior to receiving the M.D. degree as any other type of physician. With this conclusion I find myself very much in agreement, although I take issue with those who maintain that the Flexner premedical-preclinical sciences sequence achieves the result its protagonists claim for it. We seem in medical education to be singularly vulnerable to a sort of worship of immutables: the premedical sciences requirements of the twenties and thirties are immutable: so is the sequence and most of the content of today's preclinical science sequence. And so is the notion that conceptual literacy in the sciences and general intellectual ability are rigidly and forever a linear function of the passage of time. There are even a few educators who carry this belief to its logical conclusion: if eight years is now required to educate a student to the M.D. degree level, 10 years would be better and 12 years better yet. But the emphasis should, in my view, not be on more time for more science, but on better science and better teaching methods.

But all this does not relate very directly to today's topic. What does relate to it is what one might call the educational definition of a physician as opposed to the definition of other health professionals. An adequate grounding in the biosciences is very much a part of that definition, even though we may quarrel over ways and means of accomplishing that particular goal. It is, after all, inescapable that the physician's first obligation to his patient, no matter what species of physician he may be, is to know his professional business. He has other obligations, to be sure, but the conscientious discharge of those other obligations cannot act as an effective substitute for the first.

SUMMARY AND CONCLUSIONS

The responsibility of the medical schools is obviously to lay the groundwork for clinical competence, whether its graduates are to practice in a laissez-faire system, a collectivized one, or one that falls in between the two extremes. Beyond this, our schools have a responsibility for responding appropriately to changes in the system, to the extent that they can be understood and foreseen. In the United States today, there is a need in many areas for competently trained generalists to play the primary care role and, in many instances, to discharge other functions as well. But statements regarding the number of such physicians our country needs are invariably suspect and there is a danger that we may overproduce, with the result that many of these specially-trained physicians will be able to find no practice positions that are precisely related to this training. It will not do, in any event, for the medical schools to outrun the rate of development of changes in the health care delivery system. They certainly cannot dictate those changes, although some are in a position to contribute, by analysis and experiment, to the design of new methods of delivery.

One hears criticism of the medical schools for not moving more rapidly in developing educational and training programs for primary care physicians. But, in my view, they may actually be beginning to overrespond at a time when no one quite knows what a primary care physician is or should be. About all that can be said with assurance at the present time is that he will not be a twentieth-century reincarnation of the nineteenth-century horse-and-buggy doctor.

Nor is the trend toward specialization in the medical profession likely to be reversed. On the contrary, I expect it to go on very nearly to completion. But an increasing number of our specialists will actually be generalists, which is not necessarily a contradiction in terms. The rapid development and success of the American Board of Family Practice, with its strong emphasis on refined postgraduate training and continuing education, is evidence in itself that prior to 1969 the training of generalists was not thought to be wholly satisfactory. Incipient and intermittent warfare between the long-established boards and the Family Practice Board was, of course, inevitable. But it loses some of its vehemence when we realize that the traditional function of specialty societies and boards has been to design training programs and to set standards that will elevate the quality of professional services within the specialty. The Family Practice Board has, to date, conducted itself very much in this tradition, and it may be this very group that finally comes up with a generally applicable and acceptable plan for training the primary care physician.

It seems to me that, in this country, we may have the prospect of solving the primary-care-access problem more effectively than the British have done. There, a class of primary care physicians was created by legislative force, with few or no implications as to improving the training of the group or elevating professional standards. Our own as yet inadequate effort to solve the problem is non-legislative and has the prospect of improving training and elevating standards even as the primary care physician is defined. In this connection, the conscientious efforts of the American Board of Family Practice should be recognized. But, to my mind, we should not go much further, at the medical school level, in redesigning educational programs for primary care until we have come to grips with what primary care should encompass and who should provide it. I contend that for the most part the primary care function should be carried out by physicians or under their direction and that the training those physicians require is at a high level and, at the post-graduate stage at least, may need to be rather special. But to date, I have the uneasy feeling that we don't quite know what we are doing in reacting to the obvious need for primary care physicians or their equivalents.

There are many questions I have left untouched, partly because they are as yet unanswerable. Some have to do with status and the pecking order within the medical profession; some have to do with the payment of the physician and health care economics more generally. But I do wish to attempt an answer to one frequently recurring question about medical education up to the awarding of the qualifying degree. The question is: should what is usually called "undergraduate medical education" be altered if we adopt a national health service in this country? My answer is: no, not on that acount. I believe that undergraduate medical education is currently far less than perfect and needs rather continuous and critical revision, refining, and upgrading in an intellectual sense. But that is, and will remain, true no matter what happens to our health care delivery system. And as for specialization, I think the time for deploring it is past. As it is proceeding in this country, and with the inclusion of the generalist amongst the specialists, the net effect will unquestionably be an upgrading of postgraduate training and of professional standards throughout the range of practicing physicians. And that, particularly in view of the fact that it is the profession itself that is accomplishing it, is a unique and admirable achievement.

Haiti: Health Care Through a Time Machine*

By MADELINE SIMASEK†

The time machine: an ingenious device contrived by a writer of science fiction? Perhaps, but there is in fact a time machine in working order. It can be found at Miami International Airport, Florida, and its designation is Pan American Airways Flight 431. Board this flight and you will be transported back in time, as far back perhaps as two hundred years. The destination of Pan American Flight 431 is Duvalier International Airport, Port-au-Prince, Haiti.

This is not to say that there are no modern conveniences in Haiti; there is a telephone system, installed by the U.S. Marines in the twenties. The larger cities are electrified, although blackouts are frequent. There are a few luxury hotels, catering to the increasing number of curious travelers who visit the Magic Island each year, and there are more than a few lush villas sprinkled on the hills overlooking Port-au-Prince which house the rich. But by and large, Haiti has taken only baby steps since winning its independence in 1804, and most of the country is a festering sore, an incubator for disease and premature death.

A SHORT HISTORY

In the eighteenth century, St. Domingue, as Haiti was then known, was by far the richest colony in the French empire; her exports of coffee, sugar and sisal accounted for more francs than any three other colonies. The work force consisted of slaves kidnapped from West Africa, overseen by wealthy French plantation owners who were the envy of their Paris cousins. Cap Francais (Cap Haitien) was a fabled city, the Paris of the Antilles. Catholic priests were on the scene to convert the pagan slaves to the true faith, and evidently they did their work well. Indeed, the blacks showed such zeal for their new-found faith that they stayed up all night singing and dancing the praises of the Virgin Mary and St. Patrick and other Catholic saints. The plantation owners, rich, fat and sated as they were, were unaware that they were witnessing the evolution of a new religion, voodoo, a synthesis of Catholic and African beliefs. The image of St. Patrick was used by the slaves to symbolize their own African snake-god, Damballah; the Blessed Virgin represented Erzulie, the Dahomean goddess. Then in 1794, from the ritual fires at Bois Cayman, in the mountains outside Cape Haitien, there erupted a violent slave uprising, the first and only successful one in history. The revolution left the island scorched and soaked with blood but the result was Haiti, the world's first Black Republic. It added to the history books the names of some of the first black men of genius, Toussaint l'Ouverture, Jean Jacques Dessalines and Henri Christophe.

The revolution was costly; it left the people exhausted, and they seem never to have recovered. Over the years the lot of the peasant remained to be dominated, only now the domination was imposed by black men instead of white. The *status quo* was interrupted for a time in 1915, after Guillaume Sam, then president of Haiti, ordered a mass execution of political prisoners in which over 200 were killed. Their deaths caused a popular outrage, and a seething mob stormed the palace. They

*This report was compiled from information gathered in visits to Haiti and from pertinent literature on the subject.

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knocked down the gates and pulled the president bodily into the street, where they tore him limb from limb and dragged his dismembered torso through the streets of Port-au-Prince. With this, the United States saw fit to intervene and the Marines were landed. They occupied Haiti until 1934, during which time basic economic programs were begun, roads were built and a telephone system was installed. Since the occupation, millions of dollars in American aid have poured into Haiti. It would be unfair to say that no progress has been made, but, walking through the labyrinthine shanty-towns of Port-au-Prince where herds of human beings live in misery in rat-infested slums, one is hard pressed to pinpoint that progress.

THE PROBLEMS

It is difficult to reach definite conclusions as to the state of health in Haiti because reliable statistics are unavailable. The statistics used here (unless otherwise noted) are taken from a publication of the Pan American Health Organization.[1] As often as not, Haiti is excluded altogether from the statistics, or its figures are asterisked and noted to be "not reliable."

The problems: Haiti is overpopulated, her people are underfed, undereducated, and underpaid, and suffer from a lack of competent medical manpower. Let us consider some statistics.

Population

Haiti covers a land mass of 10,700 miles, an area approximately the size of Maryland. The population in 1972 was estimated at 5.0 million, which, compared with earlier statistics, reflects a growth factor of 2.1% per annum. Projecting this, we have a 1976 population total of 5.4 million.

Income

The per capita gross domestic product in Haiti is the lowest in the western hemisphere. In 1972 it was $11 per year; 1976 the figure is estimated to have increased to $130 per year. For comparison, Venezuela and Argentina have per capita figures of over $1,000 per year, the highest in Latin America.

Education

The educational level of a population is an important factor relating to health care. An illiterate peasant is unlikely to appreciate the importance of even the most rudimentary forms of hygiene.

The statistics attest to the horrendous state of education in Haiti. The ratio of enrolled students to the eligible population in 1970 is estimated as 0.27 for primary schools and 0.07 for secondary schools; the number of university-level students is too small to calculate a ratio. That only 27% of those eligible are actually attending primary schools is bad enough. The secondary school figure of 7% reflects another factor in addition to the lack of existing schools: the effect of teaching school in a language that the majority of the population do not understand. The overwhelming majority speak only Creole, a French patois, but by government dictum, instruction is given only in French (except for a few rural schools). Thus the child attends a school where French is spoken, then returns home where his family and neighbors speak only Creole. Needless to say, whatever is learned in school is quickly forgotten at home, and any interest in education rapidly disappears.

These figures are by far the lowest in Latin America. Guatemala is second with enrollments of 35%, 14%, and 2% in primary, secondary and higher schools, respectively.

Environment

Essential to the effectiveness of any health care program is an environment conducive to its implementation. The state of health of a

populace is closely related to its living conditions. Of primary importance, of course, is water. In Haiti, only 45% of the population receives piped water either in the home or within easy access. This makes Haiti one of only three countries in Latin America that fall below the 70% goal set for the 1960s by Pan American health organizations at their conference in Punta del Este. More alarming still is the statistic for rural Haiti: only 2% of the rural population receives piped water. This means that the majority of the population are forced to accommodate themselves in streams and rivers, an undependable supply considering the droughts that have plagued the island in recent years. Even in the rainy season, when the streams and rivers are full, there is no guarantee that the water is safe from a health standpoint because the Haitian peasant sees no reason not to bathe and defecate in the same area of the stream from which he drinks. This again is a problem of education.

As far as sewer systems are concerned, the problem is even worse: less than 5% of the urban population is served by sewers. This results in concentrations of human waste and garbage which draw rats and breed vermin.

Births and Deaths

We were unable to find statistics for Haiti in this area, but Guatemala, whose figures are slightly more favorable than Haiti's in most other areas, can serve as a yardstick. The life expectancy in Guatemala is 52-4 years. We may estimate then that life expectancy in Haiti may be in the neighborhood of fifty years.

A DEMOGRAPHIC VIEW

A population figure in itself sheds insufficient light on the causes of health problems. Additional factors of importance are the distribution of population across age brackets, the rate of growth (2.1% annually), urban/rural distribution of the people, and cultural and economic development.

The table below indicates the age distribution of the Haitian population in 1972, based on an estimated total population of 5,073,292.

Age Group	Population
Under 5 years	17.4%
5-14 years	25.8%
15-44 years	42.0%
45-64 years	11.7%
Over 65 years	3.1%

Comparable figures for North America are 29% under 15 years and 30% over 45 years. The implication here is that while health care in North America must be aimed at the elderly, with the goal of eradicating the chronic degenerative diseases associated with aging, the opposite is true in Haiti where infant mortality is high (146.5 deaths per 1000 live births).[2] Forty percent of all deaths occur in children under five years of age; two-thirds of this 40% are in children under one year old.

The chief causes of infant deaths under one year old, in decreasing order of importance, are influenza and pneumonia; enteritis and other diarrheal diseases; congenital anomalies; avitaminoses and nutritional deficiencies; bronchitis, emphysema, and asthma; and tetanus and other infections.

As we go up the age ladder, the causes change slightly; the chief causes for children aged one to four years are influenza and pneumonia; enteritis and other diarrheal diseases; accidents; avitaminoses and other nutritional diseases; bronchitis, emphysema, and asthma; and measles. In children five to fourteen years old, accidents become the

leading cause of death, followed by influenza and pneumonia, malignant neoplasms, congenital heart diseases, and enteritis and other diarrheal diseases.

In persons fourteen to forty-four years of age and above, mortality causes begin to resemble those of North America with chronic diseases predominating. The notable exceptions are complications of pregnancy, childbirth and the puerperium, which rank high as mortality causes in Haiti in the fifteen to forty-four age group, and influenza and pneumonia, which are prevalent in the population over sixty-five.

Aside from the diseases mentioned above, Haiti is plagued by a host of communicable diseases which, though not always fatal, are major contributors to the overall pathetic state of health in the country. These are problems throughout Latin America, particularly among children five years of age and under. There has been progress in the last decade, but as late as 1972, more than 23% of all deaths in Middle America, including Haiti, were the result of infectious and parasitic diseases. The corresponding percentage in North America was only 0.8%. Of all deaths of children under five, 36% in Middle America were caused by this group of diseases.

Malaria

In 1972 Haiti (along with El Salvador, Honduras, and Nicaragua) recorded the highest rate of malarial infection in Latin America. The rate was 375.7 cases per 100,000 people — although it must be noted that these were only *reported* cases. Haiti being Haiti, there were in all likelihood many more cases than that. In the decade 1961-71, malaria declined in Haiti, but in 1972 the number of cases rose, probably as a result of suspension of the government spraying program.

Again the epidemic proportions are due to peasant ignorance and economic depression; in rural areas, puddles of water are allowed to stand and stagnate, becoming breeding grounds for the Anopheles mosquito which transmits the disease. A more sophisticated populace might think of covering the puddles with dirt, thus reducing the breeding area of the mosquito. From an economic standpoint, the peasant who cannot afford food for his family certainly cannot afford to buy mosquito netting. So an infected peasant is bitten again and again by mosquitos which then spread the infection throughout the overcrowded village. If the peasant could be isolated under netting until he recovered, this would help curb the disease.

Measles

One of the main causes of child mortality, measles spreads rapidly through a village where all of the children are under-nourished and have a low resistance to disease. This disease can be eliminated by vaccination, but in Haiti less than one percent of the children have been vaccinated, one of the lowest vaccination rates in Latin America.

Poliomyelitis

Although not present in epidemic proportions, poliomyelitis does exist in Haiti. It also could be eradicated by immunization and monitoring.

Yaws

The great success achieved in the control of yaws is a classic example of what can be done with a comprehensive program that includes government cooperation. In the 1940s, a sweeping inoculation program was effected. A major participant was Dr. Francois Duvalier, later to become president of Haiti. As a result of this program, yaws was reduced to an insignificant problem.

Other communicable diseases present in Haiti in varying degrees and worthy of mention are schistosomiasis, syphilis, tuberculosis, typhoid fever, whooping cough, diarrheal diseases (shigellosis, amebiasis),

dengue, diphtheria, viral encephalitis, infectious hepatitis, leprosy and the zoonoses (rabies, anthrax, leptospirosis).

NUTRITION/MALNUTRITION

Agriculture

The economy of Haiti is heavily dependent on agriculture, which provides 80-87% of the jobs and 50% of the gross national product. It also accounts for 50-60% of the exports. The agricultural yield, however, is critically low for several reasons. First, 85% of Haiti is mountainous and those mountains are largely bald and barren as a result of erosion, the consequence of deforestation and poor planning. Wood is a necessary staple, for all cooking is done on wood or charcoal fires. In addition, liming is a major industry and large quantities of wood are required to fire the lime kilns. Another important industry is the manufacture of wooden handicrafts which are exported and also sold to tourists in Haiti. Haitians have historically harvested trees indiscriminately, with no thought of replanting. This leaves mountain soil rootless and erodable, so most of it has been washed from the mountains, leaving little arable land. To compensate somewhat, terracing has been introduced, and mountain gardens are sometimes so steep that it is difficult to stand up straight in them. A popular Creole story has it that a mountain farmer was killed when he fell out of his cornfield.

Other reasons for low productivity are primitive methods (slash and burn agriculture is the norm in the mountains) and antiquated systems of storage and transportation of produce, resulting in spoilage and loss.

Nutrition

The average individual calorie consumption in Haiti is 1700 per day, with carbohydrates accounting for 77% of these. Fats count for 25% and protein only 8%.

The diet of the Haitian peasant is monotonous, usually corn, sugar, manioc or rice, and beans. Animal proteins are scarce — sometimes dried fish, or even less often beef or pork. Fats are obtained from palm, coconut and cottonseed oils. Lard is eaten daily and in large quantities, as the peasant equates fat with good health.

Since income is low and food resources are limited, the peasant must feed himself on a very skimpy budget. Food expenditures per person average only eight cents per day.

Malnutrition

Although a study done in 1960 reported that 7% of children in the one-to-three age group suffered from protein-calorie malnutrition, a visitor to the non-tourist areas of Haiti might question that figure. Children are everywhere, and the number of them who display the rusty hair and distended bellies that signal malnutrition seems much higher than 7%.

The same study indicated that 50% of the people examined showed signs of existing or past riboflavin deficiency, in the form of active cheilosis, scars of cheilosis, nasolabial seborrhea or glossitis. The main sources of riboflavin in Haiti are mangos and avocados which, in season, are plentiful. Consequently, the prevalence of ariboflavinosis varies with the season. Other foods containing riboflavin (meat and milk) are either too expensive or too scarce to make up a significant part of the diet. As noted earlier, malnutrition, along with tetanus and diarrhea, is one of the most frequent causes of hospital admissions and deaths in infants. Related diseases such as anemia and thyroid enlargement are quite prevalent as well.

On the brighter side, the Haitian government has opened a number of Nutrition Rehabilitation Centers across the country. Afflicted children are grouped by the Gomez classification system according to

grades (Grade I — weight 10-24% below normal, Grade II — weight 25-39% below normal, Grade III — weight 40% or more below normal), then admitted to the centers for periods of up to four months. At the same time, the mothers of these children are required to participate in programs of education and child care which are held at the centers. Rotating teams of mothers cook the food served at the centers and learn food values and the relationship of proper food to good health. Graduate mothers and children are encouraged to share their knowledge with neighbors after leaving the center. In addition, the government nutrition bureau has developed a protein-rich weaning food based on a mixture of cereals and beans.

Sadly, most of the malnutrition and diseases could be prevented. The monumental obstacle is the ignorance of the Haitian peasant. A woman knows that in order to guarantee fertility to her newborn, she must rub cow dung on the baby's belly immediately after the umbilical cord has been cut — usually with a rusty machete. A man with tuberculosis sleeps in the same room as the other twelve members of his family. He coughs through the night, thereby spreading the disease. Another family receives a CARE package containing canned meat. The next morning the can of meat is taken to the corner store where it is traded for a sack of rice. What does it take to persuade the woman not to rub the cow dung on the baby? After all, it is a life-long voodoo practice. What does it take to persuade the man to sleep alone? He cannot afford the luxury of a private sleeping room and will not sleep outside for fear of ghosts and zombies. What does it take to persuade the family to eat the canned meat instead of trading it away? The sack of rice will last three times as long.

What it takes is time — time, patience, and a body of qualified and dedicated medical personnel.

MEDICAL MANPOWER

The delivery of health care depends on qualified people — doctors, nurses and technicians. Here are the appalling statistics (per 10,000 people) for Haiti, contrasted with the figures for the United States:

	Haiti	United States
Physicians	0.8	15.5
Dentists	0.2	5.0
Graduate Nurses	0.8	36.3
Nurses aides	2.1	64.4

So, in Haiti, there is less than one physician for every 10,000 people. The figure for the rest of Latin America is 11 doctors for each 10,000 people.

A more shocking figure is the disparity in numbers of physicians between rural and urban areas. There are 6.2 physicians per 10,000 people in the cities, but in rural areas, where more than 80% of all Haitians live, there are 0.3 physicians to each 10,000 people.

Statistics for 1972 show also that most doctors in Haiti are general practitioners. Of the 412 practicing doctors, only 13 were obstetricians and gynecologists, and only 16 were pediatricians. The same statistics tell us that in 1972 there was not a single pathologist in Haiti. Considering the importance of the pathology laboratory in diagnostic medicine, this is a bleak statistic.

The dental statistic (0.2 per 10,000) becomes even more grim when we consider the urban/rural disparity. Most Haitians will probably never see a dentist in their lives.

It seems clear that the severe shortage of doctors must be a contributing factor to the poor general state of health in Haiti. Measures must be taken to retain Haitian

physicians in Haiti, for most of them are drawn out to the financial security of the United States, Canada, and Europe. And, somehow, foreign physicians must be brought to Haiti. As poor as she is, it is unlikely that financial considerations can be used to lure qualified physicians. The country must depend perhaps on her spiritual magnetism. There are doctors who have visited Haiti, been touched by her need, and returned there to render valuable service. One such is Dr. W. L. Mellon, of the wealthy Pittsburgh Mellons. Dr. Mellon has been operating the Albert Schweitzer Hospital in the rural Artibonite Valley since 1956. The project has been privately financed, mainly with Dr. Mellon's own funds, and has done untold good for the rural district. At present the hospital has 144 beds and its clinic ministers to over 2,000 patients per week.[3,4]

But the hospitals and the Dr. Mellons are few and far between.

HOSPITALS

The ratio of hospital beds in Canada is 9.8 per 1,000 people. In Latin America the figure is much lower — 3.2 beds per 1,000 is the median. In Haiti, as usual, the figure is the lowest in Latin America, with only 0.7 beds per 1,000 people. Allowing for the rural/urban disparity, this leaves the rural Haitians with only 0.2 beds per 1,000.

These figures seem incredible, but they pale when compared with some others in the area of public health. In Canada in 1972, government expenditures on public health amounted to $229.53 per person. In the United States, the figure was $149.09. In the Republic of Haiti in 1972, public health expenditures were just 78 cents per person.

Again, this is the lowest figure in Latin America.

One of the patterns that became obvious during the course of this research is the need for maternal and child care services. So it is not surprising that in 1972 Haiti reported only one maternal health center and one child health care center. In addition to these there were fifty-seven dental clinics, two mental health clinics, four rehabilitation centers and thirty-six public health centers. The public health centers were, more than likely, malaria diagnostic clinics, equipped to do blood smears for malaria and little else.

To combine all of the above figures, in 1972 there were 165 health establishments in Haiti with outpatient services. Each unit served an average of 31,000 persons. And, unfortunately, the 1972 figures represent a decline in the number of centers from previous years.

"CRAYON BON DIEU PA GEGNE GOMME"

The foregoing facts and figures attest to the dire state of health care in Haiti. The conclusions are obvious: not enough doctors and nurses, not enough hospitals and clinics, not enough food, not enough income, not enough anything. Another principal factor contributing to this state of affairs cannot be reduced to statistics, but is expressed by the above Creole proverb which translates to "The pencil of the good God has no eraser."

These words accurately reflect the fatalistic attitude with which the Haitian peasant accepts his lot. If his newborn baby dies it is because Le Bon Dieu has so ordained; if the family mule succumbs to a case of terminal ear mites, that too is by divine plan and the peasant can do naught but transfer the load to his own bending back. The Haitian is religious to a fault; a local joke claims that 90% of the people here are Catholic while 100% of them practice voodoo.

On Saturday nights, the houmfour (voodoo temple) provides a welcome respite from the bitter realities of a back-breaking six-day work week, and all over Haiti

drumbeats call the faithful to a social "Danse Congo" or a ritual voodoo ceremony. Here the peasant can achieve a closeness to his God that few "civilized" churches can provide. He can, on occasion, actually become God for a few minutes, should he experience the moment of possession, a phenomenon in which the Loa (voodoo deity) mounts one of the participants, enters his body, and through him addresses the congregation.

The masters of these ceremonies are the houngan (voodoo priest) or the mambo (voodoo priestess). They, along with the boucor (herb doctor) are respected members of the community, especially in rural areas, and are the traditional dispensers of medical care. At times, their combinations of herbal medicines and psychological manipulations result in cures of minor illnesses, but, just as often, they result in complications of more serious illnesses. Critics of primitive medicine are wont to blame all of Haiti's medical problems on the houngan. As in any other profession, however, there are sincere houngans as well as charlatans, and a great many of the former will, when confronted with an illness beyond their grasp, refer their patient to a medical doctor, should one be available.

CONCLUSION

What about this time machine? Can its dials be spun to bring Haiti into the twentieth century? Or better yet, should we even bother to spin the dials? There are those who think not. They say Haiti is a hopeless case, better left to her own dark devices. They think that too much has been poured into Haiti already, and after the huge investment of money and manpower the place still resembles a prehistoric African village. The Haitian does nothing to help himself; there must be many other countries where the effort would be better spent. That is one feeling the visitor to Haiti could get.

But on the other hand, that visitor could be seduced by this magic place, held spellbound by the mysterious energy of a people who live daily under the grinding heel of poverty and deprivation but still manage somehow not only to survive but to feast on life itself, laughing and dancing in the faces of the Four Horsemen of the Apocalypse. Haiti has a secret. It has been whispered to a few of us, but we cannot articulate it. It has to do with the people and their indomitable spirit, which makes itself known to you through all five senses. *Joie de vivre* is the phrase most commonly used, although those are merely words and, as such, inadequate to describe a quality so lively. Suffice to say that if Haiti has much to learn, it has much to teach as well, and if the dials on this time machine are to be turned ahead, the task must be done by people who go there not just to teach, but also to learn an appreciation and respect for the simultaneous joy and pathos that is life in Haiti.

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Changes in Anatomy Teaching over the Last Two Decades: Personal Recollections *

By A. KENT CHRISTENSEN, Ph.D.†

Practicing physicians may look back, perhaps not always with nostalgia, on the anatomy courses they took in medical school. As they worked their way through the details of gross anatomy, histology, neuroanatomy, and embryology they developed, their teachers hoped, a strong sense of how the body is organized that would remain with them long after the details were forgotten. Timeless as these courses may have seemed to those who took them, the teaching of anatomy has actually changed a good deal over the last two decades. In these remarks I will give a rather subjective account of these changes, based on impressions I have gained from years of teaching in anatomy departments at Cornell, Harvard, Stanford, and now Temple.

Anatomy is not the only aspect of education that has changed dramatically over the last twenty years. We are all familiar with the spirit of innovation and experimentation that characterized the 1960s. That era saw many changes in anatomy departments, some generated from within and others imposed from without. Many anatomy departments changed their names, becoming departments of biological structure or of cell biology. Other departments disappeared altogether, absorbed usually by departments of surgery or pathology. Courses were shortened, often drastically. Dissection was dropped from many gross anatomy courses. Some of the innovations in anatomy from the 1960s were successful, while many others have proved to be of questionable value.

Now, in the 1970s, education is experiencing a return to basics. Throughout the country people are wondering why "Johnny can't read," and colleges are tightening up their courses and grading criteria. Medical education is also feeling these currents, and we can sense a trend toward solid, basic courses that provide a firm foundation for the medical career. This does not mean that gross anatomy courses will be restored to the interminable length they once enjoyed. On the other hand, I think that the pressure to reduce them to the point of triviality is diminishing. Anatomy departments are reappearing in some institutions where they had disappeared, for example at the University of Florida. Even at the University of California at San Diego, where there are no basic science departments, a distinct division of gross anatomy, including two professional anatomists, has been set up in the department of surgery. At the same institution, an elective course in histology has been established and is now taken by virtually all the medical students. Previously, the only trace of the subject was to be found in nooks and crannies of the pathology course. I understand that some dissection has been restored as an obligatory part of the gross anatomy course at Harvard, where for a time dissection had been optional. And so, without losing the genuine advances that were made in anatomy courses during the 1960s, there seems to be a tendency to return to more solid courses, with less pressure for extensive reduction and simplification.

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In one sense the need for quality teaching in anatomy is even more urgent now than it used to be twenty or more years ago. In that era, students came into medical school with a much better understanding of the body and its organization, since they usually had undergraduate courses in comparative anatomy, descriptive embryology, and other subjects that dealt with body structure and function. This is no longer the case. Students now come to us full of information about DNA-polymerase, transcription, translation and the citric acid cycle, but usually knowing little if anything about livers, kidneys, lungs, spleens, the triceps, or the sciatic nerve. For them, anatomy is a bold new frontier that should offer excitement and discovery, whether or not the information is at the forefront of current research.

I will turn now to a few comments on the teaching of gross anatomy. Gross anatomy, with dissection, has always seemed to the new student like a rite of initiation into the medical fraternity. This course assured him that he was indeed in medical school, and not merely experiencing a continuation of undergraduate courses. In gross anatomy he learned a large segment of vocabulary he would utilize throughout the rest of his life. How well I remember teaching in the gross anatomy course at Stanford in the early 1960s, when an endless 360 hours were devoted to the subject. Even this represented a cut from a previous 450 hours. The question of relevance was not a major issue in those days. Instead, students were set to the task of mastering this amazing machine that carries us around. The student was left pretty much on his own to plow through the cadaver and the textbook, with only modest help from the instructors. We all knew, faculty and students alike, that it was overkill, but such is the power of tradition. As the winds of change began to blow in the late 1960s, the time for that course was cut drastically, from 360 hours down to 180 hours. The change in teaching time demanded a change in teaching outlook, although this was rather slow in coming. Gross anatomy courses at other institutions throughout the country were also experiencing cuts during this period, and the majority also seemed to stabilize at a level of approximately 180 to 200 hours.

When I moved to Temple in 1971, I found that a similar decrease had taken place there, but that the response of the gross anatomy staff to this reduction had been very different. Dr. Carson Schneck was and is in charge of the gross anatomy course at Temple, aided by Neal Pratt, Gail Crouse, and other members of the anatomy staff. They responded to the cut in time by sifting through everything they were teaching, making conscious decisions on relevance, and then discarding anything that could not be justified on the basis of later need for at least 50% of practicing physicians. The gross anatomy course that has been developed by these individuals is indeed a winner. I am free to brag about it, since I am not directly in charge of it. It consists of some 200 hours in which the students work extremely hard, but seem to enjoy it. Although the staff puts a great deal of time into its teaching, the emphasis in the course is on learning, and the responsibility is on the student.

The course is unique in having few if any formal lectures. The main emphasis is on learning by dissection, but the key to its success is in the conferences that follow each dissection. In these conferences, individual students are called upon to deal with clinical and functional questions whose answers depend on the day's anatomy. Knowing that they will face these interrogations, the students read ahead and work very hard on the dissections to become familiar with the material. In order to save the students' time for productive learning, much of the laborious and time-consuming side of the

dissection, such as skinning the cadaver, is done by predissectors (usually paid second-year medical students). Some details of anatomy that are not of broad clinical importance are completely ignored, such as detailed blood supply of the stomach, collateral circulation around the elbow, or intrinsic muscles of the foot. On the other hand, details that yield clinical tests expected of most clinicians are heavily emphasized, such as the extrinsic muscles of the eye and their innervation (for testing cranial nerve damage). There is a heavy emphasis on relevance throughout the dissection and conferences, and the students can sense that they need to know the material with which they are dealing. It is a demanding experience, rich in significant detail. The students can take pride and satisfaction in gaining a solid sense of how the body is put together and how it works. Students have expressed the feeling later that this gross anatomy course was one of the finer experiences they had in medical school.

As you have probably surmised, we feel at Temple that dissection still has a place in a modern gross anatomy course. This is not to deny the possibility of adequate courses presented without dissection. I am fully aware of the studies done at Colorado, Arkansas, and Emory, showing that students taking less structured experimental courses may perform approximately as well on National Board examinations as students involved in more traditional courses. However, I'm not certain how well this type of examination reflects the full outlook and insight of the physician, and I can't help believing that the experience of dissecting will give a student a better sense of the body, and is therefore worth the trouble. In our anatomy teaching at Temple, we have strived to present courses that are lean, but not emaciated. I must confess that we have not expended much energy trying to determine the least amount of anatomy that can be administered to medical students without wreaking havoc later on at the bedside.

Because time is brief, I will limit my remarks on other anatomy courses to a few comments on histology. When I went to Stanford in 1961, I taught in a histology course that was probably one of the outstanding traditional courses of that period. It was a long course, with intricate structural detail, and with a prime emphasis on identification of tissues and organs. The students became very adept at subtle identifications, and could easily distinguish pyloric from cardiac stomach under the microscope. There was little fine structure in the course at that time, even though electron microscopy was common in the research literature. I taught histology the whole ten years I was at Stanford, and for half of that period was in charge of the course.

With the climate of change in the 1960s, and also under the pressure of diminishing time for the course, we made many alterations. Although the lectures still described the basic tissue and organ structures, heavy emphasis was now placed on correlating structure with function.

We also brought in ultrastructure and the results of current developments in cell biology wherever we considered them to be relevant. In studying the liver, a student still needed to know about lobules, sinusoids and bile canaliculi, but could also appreciate the incredible structural and functional organization found within the liver cell. We still based the laboratory work on a study of slides with the light microscope, although the main emphasis was no longer on identification, but rather on gaining a better feeling for the structure-function relationships within the organ. We felt that the students should be able to interpret light and electron micrographs well enough to read

the medical literature reasonably intelligently, in addition to any practical use these skills would have in pathology. The course at Stanford was popular, and received very good ratings from the students. The histology course at Temple has had a similar evolution under the direction of Dr. J. Robert Troyer, who is in charge of the course, with help from myself and others on the teaching staff.

In conclusion, I will say a few words about research excitement and the teaching of graduate students in anatomy. The training of anatomy graduate students is of great importance to us, since they will constitute the next generation of anatomists. We must help them become productive and creative scientists, as well as dedicated and enthusiastic teachers. They must be well versed in classical gross and microscopic anatomy, and yet have a thorough grounding in cell biology and other areas of modern anatomical research. Our students take basic courses with the medical students, and in addition have more specialized courses. Each spring our department offers a major course in cell biology for graduate students from throughout the university. This course is under my direction, and includes lecturers from our department, as well as from other departments at Temple and elsewhere in the Philadelphia area. To gain teaching skill, our graduate students usually teach in at least two of our departmental courses. Our department now has extensive, funded research programs in membrane transport, reproductive biology, cardiac innervation, morphometric analysis of heart cells, cell biology of schistosomes, and radiation effects on the parotid. This atmosphere of research excitement is important for the development of graduate students, to prepare them for productive careers. We hope they will find teaching and research in anatomy as rewarding and exciting as we have, and that they will become leaders in the field, to bring about teaching innovations for us to look back on two decades from now.

Osler and Mitchell*

By CHARLES S. JUDD, JR., M.D.†

On the fourteenth day of September, 1888, a 46-year-old blacksmith named Edward Martin was seen by his physician at the Orthopedic Hospital and Infirmary for Nervous Diseases in Philadelphia. The patient's record reads as follows:

> 4 years ago while travelling for about 3 months had most severe and agonizing pain in head. Also pain in back. One day was suddenly seized with paralysis of whole left side was taken to Presbyterian Hospt. and there for three months and was very much benefitted, and has been growing better ever since. He can now walk with a cane with a spastic gait can move arms well and has a good grip on both sides. K.J. plus Appetite good, bowels regular.

Treatment consisted of potassium iodide grains fifteen three times a day.

In the same month at the same hospital, a three-year-old girl, Isabella Snell, was seen by another physician. Her chart is written accordingly:

> Aet 3 years.
> Family history good. One of 7 children. Others robust. Child born after difficult labor — instrumental delivery. Was a "beautiful baby." When two weeks old had severe spasms lasting 3 days. Head was turned way over on left shoulder. Paralysis not noticed until child was nearly two years old. Now involves all right side.
> Appetite digestion good — somewhat constipated. Can talk well — intelligent looking — irregular sleeper...
> No strabismus. No nystagmus. Dentition perfect. No sign face paralysis...
> Rubbing ordered — No medication.

The physician for the first case was Weir Mitchell, a neurologist, aged 59 at the time, one of the foremost clinicians in Philadelphia. A graduate of Jefferson Medical College in 1850, he had studied with Claude Bernard in Paris, and then had entered practice with his father in Philadelphia. A keen interest in experimental work had led him into the investigation of the toxicity of arrow poisons and of snake venoms. During the Civil War, he had worked with Drs. Morehouse and Keen at the Turner's Lane Hospital, treating hundreds of soldiers with nerve injuries, and had made fundamental observations on causalgia, ascending neuritis, the psychology of amputations, and reflex paralysis. He had advocated rest in bed for the neuralgia of locomotor ataxia. He had also found time to write poetry and novels.

The physician of the second case was William Osler, aged 39, professor of clinical medicine at the University of Pennsylvania. At McGill University, he had made observations on blood platelets. His interests in Montreal had led him into pathology, public health, and, at an early age, into the philosophy and history of medicine. He had published papers on the engulfment of red blood corpuscles by leucocytes, on heredity in progressive muscular dystrophy, and on echinococcus disease.

The first meeting of these two physicians had occurred in Europe in 1884, when Osler was visiting various clinics in Germany, and Mitchell was in London. Osler was being considered for the appointment at the University of Pennsylvania, and Mitchell and his wife were asked to look him over, "particularly with reference to personal habits." Many years later Osler recalled that "Dr. Mitchell said there was only one way in which the breeding of a man suitable for such a position, in such a city as Philadelphia, could be tested: give him cherry-pie and see how he disposed of the stones. I had read of the trick before, and disposed of them genteelly in my spoon — and got the chair."[1] In making up his mind, Osler, balancing the

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pros and cons of staying in Montreal or going to Philadelphia, had found the decision unsolvable, so had tossed a coin and the "Heads" for Philadelphia fell upright.

Soon after his arrival from Montreal, Osler was called by Mitchell to see patients in consultation, probably at the University Hospital or at Old Blockley, adjacent to it, a complex with 2000 beds, the oldest hospital in the country, having been founded as an almshouse in 1742. Osler also became Mitchell's first consultant to the Orthopedic Hospital and Infirmary for Nervous Diseases, which had been reorganized by Mitchell in 1874, the locale of the two cases mentioned earlier.[2]

Osler was often a guest in Mitchell's home and became a member, at Mitchell's proposal, of the Biological Club. The latter met for dinner on the second and fourth Fridays of each month, and the membership included Leidy, Wistar, Chapman, Hunt, and others.

Despite a difference in age, and despite the relatively serious Mitchell's being a little in awe of Osler's leavening of his daily activities with humour and joking, the two soon found common bonds which would sustain a strong friendship for the rest of their lives. Perhaps a comparison of their similarities is in order.

First of all, they were bedside observers and teachers of the order of Hippocrates and Boerhaave. Osler's textbook, even the first edition of 1892, evidences his vast bedside experience by citing cases of typhoid, smallpox, chorea, pancreatitis, gallstones, and numerous other diseases that he had personally treated or autopsied. In a speech entitled "Teacher and Student" given at the University of Minnesota in 1892, he referred to the "virtue of method" and the "quality of thoroughness," which were indeed the fact collection, observation, and scrupulous attention to detail that became the habits of his students as they followed him on ward rounds.

Mitchell's clinical papers, many of which were case reports, likewise gave evidence of his long hours at the bedside or in the clinic. Reflecting on this in a little book, *Doctor and Patient*, written in 1888, he describes the importance of thoroughness in the examination of a patient:

> On another occasion, a young physician well known to me, fell by chance into a consultation with Dr. P, the physician I have mentioned, and the late Professor P. The case was one of a young man who several times had been found at morning in a stupor. The attacks were rare, and what caused them was unknown. The young physician, much embarassed, was civilly asked to examine the case, and did so with a thoroughness which rather wearied the two older men. When they retired to an adjoining room, he was asked, as our custom is, to give, as the youngest, the first opinion. He said, "It is a case of epilepsy. He has bitten his cheek in the fit." Dr. P. rose without a word and went out. Returning in a few moments, he said, "You are right. I did not look far enough back. You will reach, sir, a high rank in our profession."[3]

The bedside medicine of Osler and Mitchell exemplified their sense of the importance of being responsible for the care of patients. The sobering charge of following a patient closely, sometimes for days or weeks, is more often within the purview of a physician in private practice than a professor, but both Mitchell and Osler realized that the true physician, whether a professor or not, cannot dodge this responsibility. Osler, in deploring and warning against the impact of the strict full-time system on the teaching in medical schools, had this to say in a confidential letter to President Remsen of Johns Hopkins in 1911:

> The danger would be the evolution throughout the country of a set of medical prigs, the boundary of whose horizon would be the laboratory and whose only human interest was research, forgetful of the wider claims of the clinical professor as a trainer of the young, a leader in the multiform activities of the profession, an interpreter of science to the generation, and a counselor in public and in private of the people in whose interests after all the school exists.[4]

Mitchell also was attuned to the responsibilities of private practice, being the son of a practicing physician. Despite a

unique ability to include investigative work as well as the writing of poetry and novels in his activities, he attracted one of the largest followings of patients in Philadelphia. With a family to provide for, he was not unaware of the need of practice as a source of livelihood. As time went on, however, the responsibilities of patient care weighed heavily upon him. In an informal autobiography, he stated:

> Shortly after the war I began to find that, in consequence of my published papers, I was being consulted more and more about nervous maladies. This intruded on my morning hours so that my new work interfered with my general practice....
>
> My income gradually rose until, at a much later period, I made in one year sixty-four thousand dollars, when I determined that I should break down if I continued the amount of labor I was doing. I began to lessen my income and work by making my holidays longer and longer.[5]

In accordance with this concept of responsibility toward patients, Osler and Mitchell looked upon their patients as persons, appreciating all individual factors in the manifestations of diseases. They were willing to take the time to give a patient the total care, support, and understanding that is so important in medical care. Both, indeed, warned against the dangers of too much specialization. Mitchell wrote as follows:

> The specialist profits by the fact that his experience becomes enormous and his work advantaged by its definite limitations. On the other hand, and nowadays especially, he is apt to be one who, after brief hospital work of general character, or without this, takes up, as we say, the eye, ear, throat, or uterine organs. Unless he has had at some time a larger and more varied experience, or unless he is a most unusual man, he is prone at last to lose sight in his practice of the fact that eye, ear, and womb are parts of a complicated mechanism, and suffer through its general or local disorders. Hence the too common neglect of constitutional conditions, to which are often due the apparent maladies of the organs to which he devotes himself.[6]

In a similar vein, Osler spoke to the Pediatric Society in Boston, in 1892:

> A radical error at the outset is the failure to recognize that the results of specialized observation are at best only partial truths, which require to be correlated with facts obtained by wider study. The various organs, the diseases of which are subdivided for treatment, are not isolated, but complex parts of a complex whole, and every day's experience brings home the truth of the saying, "when one member suffers, all the members suffer with it."[7]

As investigators, both Mitchell and Osler started early. Osler, under Father Johnson, was mounting specimens of "diatomes, desmids, and congregating algae." His first paper, at age 19, was entitled "Christmas and the Microscope," and it appeared in *Hardwicke's Science-Gossip* in London in 1869. Mitchell published at age 23 a paper entitled "On Various Forms of Uric Acid Crystals." Like Osler, he was attracted toward animal experimentation. It is interesting to note the titles of some of the work each performed in his early years:

MITCHELL

Blood Crystals of the Sturgeon (1858)
Production of Cataract in Frogs (1860)
Researches on Venom of Rattlesnake (1860)
Experiments and Observations on the Circulation of Chelonia (1862)
On Retrogressive and other Spastic Movements in Birds (1867)
On the Extreme Difficulty of Influencing Birds by Opium (1869)

OSLER

Verminous Bronchitis in Dogs (1877)
On the Pathology of the so-called Pig Typhoid (1878)
On Certain Parasites of the Blood of the Frog (1882)
On Canadian Fresh-water Polyzoa (1882)
Cestode Tuberculosis. A Successful Experiment in Producing it in the Calf (1882)
An Investigation into the Parasites in the Pork Supply of Montreal (1883)

After Osler's arrival in Philadelphia, it was not long before he and Mitchell found a common interest in books. Their efforts increased the collection at the Library of the College of Physicians of Philadelphia. Their correspondence over many years often started off with a comment regarding an old book. In 1903, Osler wrote:

> Dear Dr. Mitchell:
>
> I did not pick up much in the way of books in Paris — could get no originals of Gui Patin. I got a Rabelais, edition of the aphorisms of Hippocrates, and a couple of early Avicennas. In London I got the Editio princeps of Celsus, a beauty. I missed a Grolier Rabelais — which went far beyond my purse.[8]

Cushing describes an evening in 1902 in

Mitchell's study, after a meeting they had attended. Present also were Mitchell's son, Jack, and W. W. Keen, the surgeon. The study contained copies of portraits of Harvey and Hunter, a bust of Dante, and Keats' death mask. Mitchell read some of his own verses on Guidarelli, and showed his guests Robert Burns' copy of Pope, a presentation copy of *Robinson Crusoe,* and a copy of Johnson that had belonged to Horace Walpole and later to Thackery. As the hours ran on from eleven to three, cigars came forth as well as some old Madeira that had gone around the Horn three times.[9] In later years, Cushing himself was known to host similar "Madeira parties" in his own study.[10]

Finally, the two physicians, Osler and Mitchell, were alike in their courage to stand up and be heard when they felt strongly about a subject that proved to be controversial. This outspokenness in Osler manifested itself in 1883 at the annual meeting of the Canadian Medical Association, held that year in Kingston, Ontario. A certain physician read a paper in which he scoffed at the custom of a new doctor in a community calling on those already in practice there. This physician went on to say that it was perfectly proper to report one's extraordinary cures or operations in the newspapers, and he even advocated that doctors take all the cases they could get, keeping them without reference to the previous attending physicians. This paper provoked an immediate and vigorous response in Osler. It is stated that he arose, "waved a copy of the Code of Ethics in the reader's face and publicly denounced him."[11]

Again, in 1889, in Baltimore, in addressing the state medical association he deplored the poor education of physicians by inferior medical schools, and the mere possession of a diploma as a qualification for practice:

> .....It makes one's blood boil to think that there are sent out year by year scores of men, called doctors, who have never attended a case of labour, and who are utterly ignorant of the ordinary everyday diseases which they may be called upon to treat; men who may never have seen the inside of a hospital ward....Is it to be wondered, considering this shocking laxity, that there is a widespread distrust in the public of professional education, and that quacks, charlatans, and imposters possess the land?[12]

These strong words paved the way for the establishmant of state boards of examination and state licensure.

On another occasion, Osler courageously arose during a re-election of a Dr. Atkinson as secretary of the American Medical Association, and loudly cautioned the assembly *not* to re-elect him, citing his inefficiency. The re-election evolved, nonetheless, with an affirmative vote for Atkinson, and Osler, in a characteristic way, immediately walked to the podium and shook Dr. Atkinson's hand.

Mitchell, similarly, took a few strong stands, and an early one was a criticism of Roman Catholic sisters as nurses. He stated that they were trained in the kitchen and left on the wards to pick up knowledge on their own. He deplored the fact that the rule of the sisterhood forbade a man to live under the same roof with them even if it were within a hospital, resulting in the prohibition of a resident physician so vital to emergency cases.[13] Even as late as 1892 Mitchell publicly stated that there was no scientific training of Roman Catholic sisters, and that they were by no means as good as trained nurses from other schools. This brought down the wrath of editors of Catholic journals on his head.

But Mitchell's greatest salvo was against the American Medico-Psychological Association, the forerunner of the American Psychiatric Association.[14] He had been asked to give the keynote address at their fiftieth annual meeting on May 16, 1894, and had accepted with reluctance. His resounding criticisms brought forth strong opinion and discussion as late as 1944, when the organization held its centennial meeting.

In essence, he accused psychiatrists of being

apart from the rest of the medical profession in their restrictive hospitals, and of considering themselves the only doctors competent to treat patients who were mentally ill. He criticized the separation of psychiatry from the mainstream of medicine. He suggested that psychiatrists should have at their elbows, in their hospitals, physicians of broad general training along with a knowledge of psychology and neuropathology. He deplored a lack of autopsy reports and competent original publications from asylums. He pleaded for trained nurses, physiotherapy, open wards, better food, and more pleasant furnishings. He felt that superintendents of asylums should be physicians only, and not encumbered with administrative duties.[15] (It is interesting to note that the Medico-Psychological Association had at this time 116 members, and that 99 of the members present at the meeting were hospital administrators.)

Despite an almost violent reaction to this speech initially, in which the psychiatrists arose almost as a body to give argument to Mitchell, in time some of his points struck home. Adolph Meyer, speaking in 1928 of Mitchell's address, compared it to a rhapsody, expressive of a lofty criticism, and admitted that it had been a spur for improvements.[16] And Hutchings in 1939 acknowledged that research in several institutions had been started as a result of Mitchell's admonitions.[17]

After Osler left Philadelphia, there continued a correspondence between him and Mitchell, and they saw each other often. In 1890, Osler presented Mitchell's portrait to the College of Physicians. When the time came for Osler to leave America for England in 1905, a farewell dinner was held for him at the Waldorf-Astoria in New York. Mitchell presented him with a copy of *De Senectute* by Cicero. It was Logan's translation, and had been printed by Benjamin Franklin in 1744. Mitchell's words addressed to Osler were as follows:

> You my dear Regius Professor have long been suspected of having deceived the world as regards your years. For indeed the gay comradeship which makes you the charming friend of the social hour is a convincing gift of youth....I protest that you carry your age gallantly, but I sorrowfully admit on the authority of Shakespeare that you must be well on in years for surely you have what old age gives, "Honor, love, obedience, troops of friends."[18]

In 1908, Mitchell was elected a foreign fellow of the Royal Society, which had at that time only six American Fellows. His opponent for election to membership in this distinguished group was Ehrlich. Osler wrote to him with hearty congratulation. As the years wore on, the correspondence continued, and as late as 1913, the year before Mitchell died, he wrote long letters to Osler. Perhaps representative of the endearment he felt for Osler are these lines by Mitchell written in his later years:

> Show me his friends and I the man shall know,
> This wiser turn a larger wisdom lends
> Show me the books he loves and I shall know
> The man far better than through mortal friends.[19]

Instead of "Osler and Mitchell," the title of this essay could easily have been "Mitchell and Osler." Between them there was equal give and take of ideas, and their coming together resulted in a mutuality of two of the best medical minds of an era.

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Hospital Administration and Revolution: The Economy of Pennsylvania Hospital, 1775-1782

By WILLIAM D. SHARPE, M.D.*

Unlike most revolutions, the American Revolution ended with the country's social institutions reasonably intact. Among them was Pennsylvania Hospital, founded in 1751. Its records tell how the Revolution affected its internal operation, and how its Managers survived war, military occupation, and inflation. Its account books for that period contain three distinct types of records in a single volume: terse notes of admissions, discharges, deaths, and memoranda by attending physicians and sitting Managers, who visited the hospital every third day; an end of the month census with patients classified as "poor" or "pay," and with the letter *L* (lunatic) to indicate psychiatric patients; and the steward's recapitulation of cash received and disbursed since the previous report. These records are the basis of this study.

The hospital occupied two brick buildings at the southeast corner of a square bounded by what are now Spruce and Pine, Eighth and Ninth Streets. The East Wing, occupied in 1756, was T-shaped, 80 by 27 feet, with a 110-by-27-foot wing at right angles. The ground floor contained service areas and cells for the insane, the first and second floors had wards for men and women respectively, and garret rooms accommodated servants and isolation cases. North of the longer wing, parallel to Eighth Street, stood the North House or "Elaboratory," a 2 1/2 story brick building about 20 by 80 feet, built in 1769-1770. Solid enough to serve the hospital into a third century, the East Wing was nineteen and the North House five years old in 1775.

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PATIENT POPULATION

In 1775, Pennsylvania Hospital admitted only a few classes of patients: travelers, those whose homes could not provide care, and "lunaticks" difficult or impossible to manage at home. Middle and upper class citizens were born, were cared for in illness, and died in their own beds at home. One or two attending physicians and two of the Managers, the "Sitting Managers," visited the hospital formally every third day to admit and discharge patients, and it was expected that discharged patients would appear to thank the Managers. Limited resources were not for the incurable, and we note that on 9 September 1775 Sarah Ross, for example, was discharged to the workhouse as incurable.

Patients received free accommodations and care, but had to provide security, that is, assets to pay for their burial. Although usually a promissory note or the signature of a respectable citizen was required, many entries indicate that personal property was sometimes accepted as security for burial expenses. For example, on 11 October 1775: "Admitted Collin Crilly, poor, Pleurisy — left a Silver Watch as Security." 9 December 1775: "Admitted Sarah Francis & Child, Venereal; leaves Cloaths in c/o Stewards Hands for Security"; (her death is recorded on 25 December, with the stark note, "her child sent to ye house of Employment"); 25 September 1776: "Admitted Nicholas Doran Poor with a Fever — his cloathing is all his security which is thought will do" (he died on 16 October, and his clothes were returned to his brother, who paid for his burial); 24 May 1777: "Admitted Mary Brown, poor, remitting fever. Upon examining her Clothes,

TABLE 1: Naval Admitting Diagnoses, October-November, 1775

Oct. 14.	William Stickney. . . . wounded thigh
Oct. 17	John York Wounded hand
	Patrick Grant Flux
Oct. 28	John Himinger. . . . Tumor on the Knee
Oct. 25	James All, poor, Bruised Leg
	Richard Newton, do. purging & Fever
Nov. 4	Charles Hopey Rupture poor
	Arthur McCullough Intermittent do.
Nov. 7	Peter Aley Rheumatic pains poor
	John Donnelly Fever do
	Patrick Grant poor Flux
Nov. 19	Richd. Collier, Poor, Fever & pain in his side
Nov. 20	William Stickney do Sore Knee
	Thomas Tucker do Sore Leg
Nov. 21	James Clark do do
Nov. 22	Richard Brown do Rheumatism

Note: "Do."=Ditto.

they are allowed for security." In other words, many "poor" patients' only assets were the clothes on their backs.

Some patients, perhaps voluntarily, agreed to work in the hospital after discharge to pay for their care. For example, on 6 October 1776: "Admitted Mary McGill — poor — Venereal — Mary Allice Security & P. McGill has given a note to serve as a Made in ye. ho. 4 mos. after cur'd." Payment was firmly required for treatment of the "Venereal" — usually three pounds ten shillings, a very substantial sum — but the Managers were punctilious and on 25 July 1778 noted "Discharged James Erwin — cured — returned Thanks — his Case was not venereal consequently the Agreement for payment becomes void." But when payment was due, it was due, and a note of asperity appeared on 15 July 1778:

> On the 4th Inst. Notice was given to Charles Ward & Thos. Say by the sitting Managers, that if the Arrears due for Richd. Chubb's boarding were not discharged without Delay, he would be sent back to them. The Steward of this House having delivered the Notice, but without producing the intended Effect, the said Steward is ordered forthwith to deliver the said Richd. Chubb to Charles West & Thomas Say.

This was accomplished on 19 July 1778.

In these account books, we meet real people. One 3 June 1775: "Discharged Mary Dillwyn, as a pay patient, being cured, but detained in the House as a Servant, for her pay, as her Master is in Prison and not likely to pay for her cure"; 13 September 1775: "Discharged Hannah Beroh — Relieved, taken Away by two Constables"; 20 September 1775: "Admitted Dorothy Johnson a poor patient with Lues Venerea sent In by the Mayor"; 16 March 1776: "Admitted. Capt. Richard Taylor. from the Prison Mortification in his foot. The Sherriff Wm. DeWees Security"; 19 February 1777: "Admitted Henry Morris, Poor, a Defect in his Vision. John Gallagher a Tavern Keeper in 2d Street near Vine Street Security — p[er] note —"; 8 August 1778: "Discharged George Conolly — cured by Abstinence from Spirituous Liquors, returned Thanks, & promised to abstain from Spirituous Liquors for one year."

Northerners congratulate themselves that the peculiar institution of slavery was limited to south of the Mason-Dixon Line, but it is present in these hospital records under a euphemism — *Negro* or *servant* means *slave,* because a free Negro or *Freedman* is consistently so classified. Slaves got appropriate medical care as pay patients for whom their masters were responsible. On 14 June 1775: "Admitted Austin a Negro Man, a Wounded hand & arm, belonging to Dr. John Cox, he is a pay Patient at 15/- p[er] week under the care of Doctr. Redman." But note the comment on 23 August 1775: "Discharged John Codagan [and] Thomas Conveney as Incurable — It appearing to the Managers that John Codagan is a poor Freedman and not a servant of David Potts Junr., they have forgiven his pay for Board..." And on 11 November 1781: "Admitted Samuel Binns, a Negroe boy Ulcerated & Carious Bones. Pay. belonging to Charles Logan who is his

security." Binns was discharged "relieved" on 12 December 1781.

WAR

The Revolution was not uniformly popular, in Philadelphia or elsewhere, and Quaker non-combatant views required both abstinence from bearing arms and strict neutrality. Morton and Woodbury[1] provide some background:

> The members of the Society of Friends were, by their religious principles, non-combatants....When the colonies resorted to arms, however, acting in accordance with their religious principles, many Quakers refused to take up arms or actively assist, either directly or indirectly, the American cause. Their neutral attitude and consistent conservatism gave rise to the popular belief that their personal influence would be exerted against the Colonies, hence, during the excesses of party feeling they became the objects of general suspicion by the remainder of the community.
>
> Congress, in 1777, formally recommended that the Executive Council of Pennsylvania apprehend and secure a number of the most prominent and representative members of this sect living in Philadelphia; and by Order of Council, in August of that year, a number, including several Managers of the Hospital, were arrested and without a trial were exiled to Staunton, Virginia, where they were compelled to remain for about eight months.

Hospital accounts reflect this neutrality and during 1775-1782 make no comment whatever on the merits of either side.

During October and November 1775, the hospital received some sick and injured sailors from the "Arm'd Boats"; they are listed in Table 1. Two of the sixteen patients were readmissions, confirming the chronicity of many diseases; of fourteen individual names, only two were injured or wounded rather than sick. Prisoners from both sides were admitted to hospital, and on 6 December 1775 Robert Colebrook and Thomas Finn, "poor, Fever, Continental Prisoners" were admitted, although the record does not make clear whether they were prisoners of the British or of the Continentals.

Because of the pacifist Quaker tradition (in September 1782 the cash accounts list "Paid Militia Fine for Nonattendance at Exercises 40/6"), combatants from both sides were accepted as patients, but Table 2 demonstrates the extreme brevity of records. Not all military patients really needed hospital care, and in the December 1776 report we read: "On the 5th Instant the following Soldiers were sent to ye Hospital by the Council of Safety, which on a Conference with them, they agreed to pay for at ye Usual Rates." This is followed by a list of seventy soldiers: twenty-nine "in health," four convalescent, thirty-four "sick," and one each with sciatica, jaundice and lues venerea. On 8 January 1777 twelve more were admitted by the Committee of Safety, one of whom had lues venerea and had to pay, and twenty-seven soldiers were discharged; twenty-one had died during the previous month, and three wounded seamen were admitted "by order from Rob' Morris on behalf of the Marine Committee." On 13 January 1777 ten more wounded soldiers and another sailor were admitted. Nor were all hospital admissions for physical disease or injury, for we find on 12 April 1777, "Admitted William Howell, Seaman on pay disorde'd in his senses. The Marine Committee Security." On 13 January 1777 twenty-six wounded Hessians were admitted; three died on 18 January and one on 22 January, so that, at least in January and February of 1777, both Continental and Hessian soldiers were in the hospital at the same time.

BRITISH OCCUPATION

The Managers carried on, but things were not easy; the record for 27 September 1777 reports:

> Part of ye English Army under General Sir William How, haveing enter'd ye City on ye 26th — this Day a great number of Sick & Wounded Soldiers, were, without previous Application, or Notice, to ye Managers Order'd into ye Hospital,

> which crouded the Wards Incomoded our Patients, & render'd it impracticable to preserve ye Order of the House — in ye general Confusion ye following persons eloped...

Five patients ran off. A week later, on 4 October 1777, a fine clerical hand recorded the usual "The Doctors have given good attendance and the Patients are well taken care of," but another hand (probably that of Manager Samuel Rhoads) inserted "as" between "are" and "well" and added "as our present circumstances will admit." This is the first such qualification, but it is repeated in the October and November 1777 reports.

British occupation of Philadelphia livened the social scene, but disrupted the hospital's day-to-day operation. The following minute is dated 3 December 1777:

> This Day Dr. Norris, Inspector General of the British Hospitals, visited the House & the Managers & Physicians attended him thro the Wards. Upon a free Conference the following Turms were settled — to remove all our patients into the north House wch: is to be purely for their use; the Lunatics to be kept in their cells as usual; the Steward & Matron to preserve their Apartments; the Managers the the Possession of their Room, occasionally; & Joseph Mountz to be undisturbed in his Chamber: the Remainder of ye House to be appropriated to the Service of the Troops, who are to be accommodated with such furniture as can be spared, the Residue to be packed up & kept by the Steward.

At least one British surgeon had the instincts of a gentleman, and the cash account for 17 January 1778 notes, "rec'd of Wm. Thomas Surgeon on Guinea for dining with us some Time after the English came here... £1-15-0."

Disruption of hospital services compromised its teaching program. For £1 10s. a student could attend clinical lectures and use the library. Private pupils often attended with their preceptors when they were on service, but the hospital itself had an apprentice who followed British precedent by training as a surgeon-apothecary. The events of the early winter of 1777 disorganized his training, and on 20 December 1777 we read:

> Our Apprentice, Jacob Erhenseller, having very little Employment at present, expressing great Uneasiness at his Situation and his Father, having been consulted, being desirous to have him at home — the Managers, considering all the Circumstances of his Case, agree to permit him to remove to his Father's House & continue there until it may be thought convenient, by a Board, for him to return & resume his Duty in the Institution.

TABLE 2: A Sample of Military Admissions, 1776-1781

Aug. 21, 1776	Admitted. Wm. Whiting. a Wounded Soldier on pay. Chas. Thomson Secusity.	
Dec. 14, 2786	Admitted Charles Cain a sick soldier John Lee a wounded Sailor Reynolds a wounded Sailor	Council of Safety Security
Apr. 3, 1779	Yesterday came into the Hospital about Forty Convalescents Belonging to the Continental Army.	
Jan. 1, 1780	Admitted Edmund Leys — pay Patient, a Lunatick, a Soldier in the Continental Service, the President Joseph Reed Security for his pay & c.	
Jan. 5, 1780	Admitted Daniel Bowling a poor Soldier in the Continental Service, Venereal. pay Patient, under the Care of Doctr. Hutchinson, who is his Security.	
Aug. 8, 1781	John Miller, a British Prisoner, was admitted — Bilious Fever.	
Aug. 27, 1781	Admitted John Siberell (fever) a Brith. Prisoner on pay, Capt Stocker his Security.	

By late 1777, evidence of privation appears in the accounts. On 20 December 1777 the census was twenty poor, four pay and Joseph Mountz (who spent the entire war in the hospital, but was not considered a patient). The record states: "Dr. Bond attended agreeable to the Minutes Upon Inspection the Wards &c appeared clean, but the patients, especially the Lunatics, in great Want of necessary Cloathing." The following month, on 26 January 1778, "Dr. Bond attended as p[er] Minutes, the Wards much as usual, but the Patients in the Cells suffer much for want of Fire." The British stole much of the hospital's bedding during their occupation, a loss which caused much distress, as noted on 28 March 1778: "The doctors gave due attendance the Cells, & Apartments allowed us, are clean, & in good Order Bedding &c

mentioned in ye last Report not return'd." It was still missing in April.

The British evacuated Philadelphia on 18 June 1778, and we find this note dated 26 June 1778:

> The Doctors gave good attendance, the Cells Apartments & Bedding do not appear to be in as good order as usual, there not having been sufficient time to clean the house effectually, since the English Army left it.

Continentals in due course succeeded the British, and a formal memorandum is dated 22 July 1778:

> Application having been made to the Managers, by Thos. Bond Jr. A. D. G. & Jonathan Potts D. D. G. of the military Hospitals, requesting the Use of the Elaboratory [North House] for the purposes of the said Military Hospitals, their Request was complied with & a written agreement drawn up & signed by the following Managers — viz. Israel Pemberton, Samuel Rhodes, Wm. Morrell, Edwd. Pennington, Jas: Pemberton, Saml. Powel, John Reynell & Robert Strettell Jones — & was also signed by the said Drs. Bond & Potts.

This did not, however, relieve the lack of bedding, and on 29 August 1778 we read:

> The Physicians have given due attendance, & we find, upon Inspection, that the beds & those Wards in which there are Patients, are kept clean & in as good Order as can be expected, untill a further Supply of Beds & Bedding, is provided.

Scarcity continued for the rest of the War. Comments are a terse but regular part of the Managers' monthly summaries; on 28 December 1778 we read, "...the Patients are as well taken care of as the nature of Things will admit —Bed Cloths & Beding wanting for some of them"; 23 January 1779: "The Wards & Beds upon Inspection appear clean & the Patients are more comfortably provided for than for some time past"; 27 March 1779: "... the Bedding is in good order, and the Apartments are clean, except two of the Cells"; 23 October 1779: "The Doctors have given due attendance & Some of the Appartments pretty clean"; 25 March 1780: "The Doctors have given due Attendance & the cells & Apartments appear in as good Order as the present disturbed State of the Institution will admit"; 28 February 1780: "... the Apartments are in good order, except the cells, of which many of the windows are broken"; Feb. 24, 1781, "The appartments &c appear pretty clean and in order Except the Windows which want Repairing"; 22 September 1781: "The Apartments clean & in good Order excepting the want of Beds and beding."

INFLATION

After the British evacuated the city in June 1778, a law was enacted requiring the payment of debts in Continental currency. The Managers fought this legislation because the hospital's chief income was interest on its capital stock, or endowment, invested chiefly in property mortgages and in what would now be considered commercial paper. Eighteenth century America was capital-poor, and careful investment was as important as the Managers' day-to-day supervision of hospital activities. As the Managers feared, many debtors did settle obligations in depreciated currency. When Continental currency was repudiated, State money stood at 171 Continental to 1 Pennsylvania, and Pennsylvania money at 5 to 1 against gold. Table 3 summarizes the hospital's loss of about half its assets between 1774 and 1784; it does not include additional losses from payments of board, tuition, rents, and miscellaneous charges in depreciated money, and therefore substantially understates the losses.

Continental currency was first issued on 10 May 1775. In 1781 the Pennsylvania General Assembly passed "An Act directing the mode of adjusting and settling the payment of debts and contracts entered into and made between January 1, 1777, and March 1, 1781, and for other purposes therein mentioned." Continental currency was refused in payment of taxes and, therefore, repudiated as legal tender after 31 May 1781; it had by then depreciated approximately seven hundred times against gold.

The hospital money of account during the Revolution and for some time thereafter was sterling. During the war, as hard money became scarcer, various paper currencies circulated, and in January 1778 "Old Paper Money" and "Congress Money" are separately accounted, with hard money or specie segregated in the accounts. For example, in April 1779 six pounds weight of candles cost 11s. 3d. in hard money, but £2 5s. in Continental money. Dollars are occasionally mentioned before July 1780 but are converted to sterling. By December 1779, hard money, Continental money, sterling and State money all circulated in constantly variable relations which made bookkeeping extremely tedious. On 17 April 1780, a hard dollar for one week's hospital board was accepted as equivalent to £30 in paper. Beginning in July 1780, accounts are kept in dollars and converted to sterling at the official rate of one dollar to 7s. 6d., with the exchange noted in the accounts. Finally, on 31 May 1781, accounts were changed from repudiated Continental currency to sterling, and a balance of £390 19s. 11d. became £5 4s. 3d. at the then official, and inflated, rate of seventy-five to one.

TABLE 3: Pennsylvania Hospital, Loss of Capital and Interest, April 1774 to April 1784*

Productive Money at Interest, 1774	£18607 8 4
Productive Money at Interest, 1784	9516 18 11
Reductjon of Principal	£9090 9 5
Loss by receiving Interest in Continental Currency	2349 8 2
Total Loss: Capital and Interest	£11439 17 7

*From Morton and Woodbury (Ref. 1), p. 57.

Table 4 summarizes the hospital's cash flow for 1775 through 1782, based on monthly financial statements. "Household" includes the hotel costs such as food, heat, candles, expendable supplies and the like; "wages" include cash wages but exclude maintenance because not separately listed, though the Steward is sometimes charged board for his wife and family; "apothecary" includes surgical instruments, wine, spirits, drugs and medical supplies; "incidentals" is a catch-all; "furniture" includes glassware and dishes; and "repairs" includes both the hospital buildings and grounds, and rental properties owned by the hospital. Under income, "treasurer" denotes money paid by the treasurer, most of it hospital endowment interest; "pay patients" were mostly venereal or psychiatric patients; and the "charity box" collected anonymous cash gifts. "Miscellaneous" includes such income as payment for broken window panes, the sale of a newborn calf, and fees for viewing Benjamin West's painting of "Christ healing the Sick." "Rents" came from property owned by the hospital, including the North House, and "tuition" is money paid by students to use the library and to attend clinical lectures.

TABLE 4: Summary of Cash Flow Distribution, Pennsylvania Hospital, 1775-1782, as Percent of Total

	1775	1776	1777	1778	1779	1780	1781	1782
Expenses:								
Household	67.8	74.3	86.7	86.7	93.9	84.5	75.9	74.7
Cash Wages	12.6	13.8	5.9	3.9	1.5	6.7	12.7	8.6
Apothecary Shop	8.7	4.4	3.9	3.3	3.1	4.3	7.1	5.3
Furniture	1.6	4.0	1.1	0.8	0.5	1.7	0.6	2.2
Incidentals	0.8	1.0	1.8	2.0	0.8	1.9	2.5	0.7
Repairs	8.8	2.5	1.2	3.3	0.2	0.8	1.3	8.6
Total (Pounds)	1691	1149	1486	1765	7899	52624	30157	1517
Income:								
Gifts	0.0	0.1	0.2	0.0	1.7	0.5	6.4	0.2
Treasurer	75.9	78.9	63.7	94.2	89.4	79.9	66.4	47.5
Pay Patients	17.8	15.9	33.9	2.8	5.8	12.8	21.0	38.4
Charity Box	1.3	1.7	0.5	0.3	1.6	3.4	2.7	7.8
Miscellaneous	0.9	0.7	0.5	0.7	0.5	1.9	0.8	1.2
Rents	1.0	0.7	0.9	0.0	0.9	1.5	2.7	4.5
Tuition	2.9	2.1	0.3	1.9	0.1	<0.1	<0.1	0.5
Total (Pounds)	1707	1173	1530	1800	8141	51596	30036	1393

Inflation drove houshold costs — food and shelter — to more than 85 percent of the 1777 to 1780 budget, with compensatory cuts in wages, furniture and repairs. Except for 1777 and 1778, the charity box was a fairly constant although small percent of income, but other gifts were usually less significant. Tuition fell and rents fluctuated, but these sources had not really constituted significant hospital income at any time. After a 1777 increase from military and naval personnel, pay patient income fell sharply in 1778-79, then rose to almost two-fifths of total hospital income in 1782. The treasurer still had to find most operating funds, and apparently pursued payment for patient care as energetically as he could.

Table 5 illustrates some typical changes in commodity prices during the period. Only items listed in two or more years by both cost and unit of sale could be reviewed, but the list of ordinary household needs demonstrates the rapacity of three-digit inflation. We have seen that many patients could, on admission, offer only their clothes as security against burial expenses, and we can imagine the privation these prices represent.

The Managers were businessmen, but bookkeeping was not yet standardized, and much variation exists in the detail with which records were kept. Whoever kept accounts for May and June 1782 was unusually methodical: May: "8 goose eggs 1/4, 50 clams 1/6," and June: "2 cows taken to bull 15/-." Cost comparisons are obscured both by insufficient detail, and by grouping items. For example, in early winter of 1777 beef was 2s., veal 2/6 and pork 1/2 per pound, but meat is

TABLE 5: Some Typical Price Changes, 1775-1782

	1775-1776	1777	1778	1779	1780	1781	1782
10d Nails (Pound)				1. 5. 0		5. 0. 0	1. 6
Surgeon's Lancet	2. 6			2. 5. 0			
Butter (Pound)	0. 9	3. 0	2. 7		6. 0. 0	8.13. 0	2. 6
Milk (Gallon)	0. 8	1. 6	4. 5	15. 0	4. 0. 0	12. 0	2. 0
Cheese (Pound)	0. 8	1. 2	2. 9		2. 5. 0		1. 2
Salt (Bushel)	7. 0	14. 0	8. 6	6.10. 0	40. 0. 0	£235	1. 0. 0
Sugar (Pound)	2. 0	1. 8		1. 0. 0	3. 0. 0		1. 0
Molasses (Gallon)		4. 8	1.17. 6	4. 0. 0	27. 0. 0		10. 2
Mustard ("Bottle")			3. 9	15. 0	5. 5. 0		1.10. 2
Corn Meal (Bushel)	4. 0	10. 0	11. 6	7.10. 0	20. 0. 0		4. 6
Rice (100 Pounds)		8. 0	2.10. 0		9. 0. 0		2. 0. 0
Potatoes (Bushel)		3. 0	15. 0		10. 0. 0	11. 5. 0	4. 0
Turnips (Bushel)	1. 0	2. 6			7. 0. 0	11. 5. 0	4. 0
Coffee (Pound)	1. 6	2. 5	8. 0	2. 0. 0	6. 0. 0		1. 8
Rum (Gallon)	2. 9	16. 0	1. 0. 0	5. 0. 0	40. 0. 0	56. 0. 0	15. 0
Writing Paper (24 Sheets)	2. 6	5. 0	7. 0	1.10. 0	7.10. 0		2. 6
Candles (Pound)	1. 6		1.10	12. 6	4.10. 0		2. 0
Soap (Pound)		1. 6	4. 6	10. 0	3. 0. 0		
Man's Shoes (Pair)	9.10	1.10. 0	2. 5. 0		35. 0. 0		15. 0

Prices are in pounds, shillings and pence, omitting fractional pence.

usually grouped in the accounts, and we cannot be sure about price fluctuations. Similarly, although coal heated the cells and cordwood the rest of the hospital, both are charged with cartage and haulage, so we cannot trace changes in the cost of heat.

During July 1780, as an example, apothecary expenses came to £158 0s. 6d., for which only three items were obtained: 120 sheets of writing paper, one gallon of wine, and ten quarts of rum. During the same month, a patient named Joseph Russell needed a pair of shoes which cost £39 7s. 6d., but he had only £27 15s. and the Managers made up the difference. In December 1780 a copy of Cullen's one volume *Practice of Physic* cost £131 5s.

Review of per diem patient costs (Table 6) demonstrates stability during 1775 and 1776, an increase of about half during 1777 and trebling during 1778. After the British evacuated Philadelphia in June 1778, Continental or Pennsylvania currency replaced sterling, and per diem cost rose sharply in the next two years, reaching over six pounds in the first quarter of 1781. Although much of this increase was "merely paper," financial dislocation was real, and goods followed hard money into hiding.

TABLE 6: Per Diem Patient Costs, 1775-1782

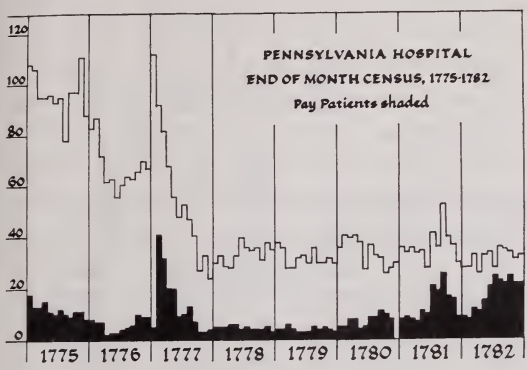
Quarter		Cash Flow	Total Patient Days	Average Per Diem*	Average Yearly Per Diem	Note
1775	1	573.14. 8	9270	1. 3		
	2	545. 8. 4	8420	1. 3		
	3	367. 5.11	8100	0.11		
	4	437.19. 7	8760	1. 0	1. 1	
1776	1	401.15. 4	7260	1. 1		
	2	297.18.11	5430	1. 1		
	3	336. 9. 5	5640	1. 2		
	4	319.14. 3	6090	1. 0	1. 1	
1777	1	597. 4. 5	8580	1. 5		
	2	694. 2. 0	5160	2. 8		
	3	473.17. 3	4230	2. 3		(a)
	4	141. 7.10	2520	1. 2	1. 9	
1778	1	518.11. 5	2760	3. 9		
	2	405.10. 9	3030	2. 8		(b)
	3	551.17.11	3210	3. 5		
	4	628. 0. 0	3120	4. 0	3. 3	
1779	1	1143.14. 8	3060	7. 6		
	2	1024.14.10	1890	5. 6		
	3	1208.19.11	2880	4. 3		
	4	5402.18. 8	2760	1.19. 2	14. 1	
1780	1	7593.14. 4	3510	2. 3. 3		
	2	16506.13. 9	3180	5. 3.10		
	3	10666.14. 6	3060	3. 9. 9		
	4	23875. 3.10	2520	5. 9. 6	7.16. 3	
1781	1	19532. 2. 0	3180	6. 2.10		
	2	12203. 4. 4	2910	4. 3.10		(c)
	3	343. 7. 4	3930	1. 9		
	4	282. 3. 2	3210	1. 9	2.12. 4	
1782	1	296.19. 0	2670	2. 3		
	2	441.15. 8	2790	3. 2		
	3	444. 6. 3	3270	2. 9		
	4	510. 2. 5	2940	3. 5	2. 9	

*All sums are L.s.d. as carried in hospital accounts, omitting fractional pence.
(a) British occupy Philadelphia, September 26, 1777.
(b) British evacuate Philadelphia, June 17, 1778.
(c) Continental currency repudiated, May 31, 1781.

The hospital had been founded as a charity and Figure 1 shows the proportion of "pay" to "poor" patients from 1775 to 1782. Except for a few months during 1777 when the Marine Commission or Committee of Safety was paying board for a number of soldiers and sailors, not more than about one patient in five was on pay status until the middle of 1781. Most patients listed as "pay" were in fact slaves for whose care their masters paid, wealthy lunatics whose families paid, poor lunatics for whom the Overseer of the Poor paid, or patients with venereal infections who were expected to pay or to work out the costs incurred by their misadventures on the sheets of Venus.

After the middle of 1781, when Continental currency was repudiated, the proportion of pay patients rose sharply, abated during the winter of 1781-1782, and rose again during the spring of 1782 and thereafter. The patient census was much under capacity, and accounts suggest that the Managers not only reduced bed capacity but made sustained efforts to capture payment, especially from Overseers of the Poor, and with some success. The pattern of admissions changed only slightly, although there were more psychiatric and fewer medical-surgical patients. The increase in "pay" patients perhaps came less from changed financial status of patients than from the proportion of bills collected. Renting out the North House reduced available beds, and therefore operating expenses.

Fig. 1 End of month census, Pennsylvania Hospital, 1775-1782.



The hospital was very carefully administered, and the Managers oversaw every detail of its operation. Witness a note dated 13 April 1776: "NB. We have given directions to the Steward to take three gallons of milk less each day than ye usual quantity on acco. of the decrease of the number of Patients." During some months, income and expenses did not balance. In January 1778, for example, the shortfall was £60 8s. 7d., and the next month it was £86 9s. 7 1/2d. The Managers, judging from the accounts, reacted energetically: they solicited gifts, cut expenses, deferred maintenance and collected outstanding bills. They borrowed hard money, and in 1780 they received from the Pennsylvania Assemby an emergency grant of £10 thousand Continental, which amounted to £163 18s. 8d. in hard money.

The cost of labor has been difficult to assess, but the washerwoman's daily rate appears regularly. We may assume that her pay was the minimum needed to keep her alive and able to work, and that nobody would work more cheaply. She was paid about two shillings and sixpence daily throughout 1775 and 1776, a little more — perhaps three shillings and fourpence — during 1777, and was back to the lower rate during 1778. After that, her daily pay increased sixfold in the spring, eightfold in the summer and twenty-four times (to three pounds) by the fall of 1779. During 1780, it reached seven pounds ten shillings, then fell to two shillings and sixpence in the late spring of 1781 after Continental money was repudiated, and rose to five shillings during 1782. Only then did her earnings begin to catch up with inflated costs. One suspects that during most of the war, she was hungry, cold and ill-clad, without an extra penny for such little comforts as an ounce of tea or a bottle of rum, which in the spring of 1782 cost one shilling each.

Deferred maintenance carries certain hazards, and on 24 November 1781 the Managers noted:

> Doctor Bond has given regular attendance, the Apartments are clean, but Blankets are wanting and Coals to make fire in the cells where the Lunatics are lodged — and some Repairs to the hinges & hasps of the Cell doors —

During 1779, £15 had been spent on repairs; £440 17s. 3d. in inflated money during 1780; and £18 16s. hard money in 1781; but in 1782 things were easier, and £130 12s. was spent. Hence, we read for 9 September 1782:

> This day according to appointment a Committee of the Honble Assembly of Pennsylvania met at the Hospital and being attended by the Managers above ment'd [R. Kean, A. Hubley, Thos. Franklin & Joseph Hires] together with Doctor Morgan they went through the House, and expressed great Satisfaction at the order the Hospital was in.

Governments are traditionally slow to pay both physicians and hospitals, but even the Continental Congress came around eventually, and on 26 October 1782 paid part of the rent due under the lease of 22 July 1778: "By [cash] rec'd from Dr. Thos. Bond Junr. by the hands of Reynold Kean, it being in part of Rent due for the Elaboratory since Robt. Morris Esqr. was appointed Financier General." This came to £18 15s. hard money.

Contributions came in, although slowly. On 6 April 1778 the Steward, John Story, "abated" his charges £6 15s., which was accepted as a credit item. Costs were cut, and

APPENDIX

Summary of Cash Accounts, Pennsylvania Hospital, 1775-1782.

Year Quarter	DISBURSEMENTS, 1775-1782 Omitting fractional Pence						INCOME, 1775-1782 Omitting fractional Pence						
	Household	Wages	Apothecary	Furniture	Incidental	Repairs	Gifts	Treasurer	Pay Patients	Charity Box	Miscell.	Rents	Tuition
'75-1Q	318. 2. 5	53.10. 3	50. 2. 8	16.14. 6	8.10. 0	108. 5. 0		375. 0. 0	126. 5. 0	6. 6.10	10. 4. 0	3. 0. 0	5. 0. 0
2Q	341.18. 6	61. 0.11	42. 5. 5	4. 0. 6	1.17. 6	31.12. 9		400. 0. 0	81. 7. 6	7. 0.11	4. 3. 2	1. 0. 0	
3Q	226. 5. 4	37. 3. 9	29.17. 0		2. 0. 8	1. 0. 0		300. 0. 0	18. 7. 6	5. 2. 6	10. 0	11. 6	5. 0. 0
4Q	259.16. 5	61. 6. 6	22. 7.10	6.14. 6	18. 9	5.18. 0		220. 0. 0	81. 5. 0	3. 6. 5	15. 0	12. 0. 0	40. 0. 0
'76-1Q	266. 4. 7	48. 0. 2	4.14. 8	19.17. 5	11.10. 0	16.12. 4	1.10. 0	300. 0. 0	53.18.10	4. 4. 2	6. 0		5. 0. 0
2Q	168. 6. 8	53.16.11	8.17. 1	6. 8. 2	9. 0	2. 7. 4		175. 0. 0	68. 2. 0	3.11. 9	1.16. 2	8. 0. 0	
3Q	184. 9.11	37. 6. 0	10.15. 3	1. 5. 0	10. 0	7. 3. 0		230. 0. 0	10.17. 6	6. 7. 5	5.10. 0		5. 0. 0
4Q	234.17. 8	18.10. 4	25.11. 7	18. 7. 1		1.17. 8		220. 0. 0	52.17. 6	5. 8. 9	16. 0		15. 0. 0
'77-1Q	374.16. 2	18.19. 3	19.10.11	9. 1. 1		11.18. 6		120. 0. 0	333. 5. 0	1. 7. 2			
2Q	572.10. 3	17.18. 6	9.10. 0	1.13. 0	3. 8. 1	3.16. 3		443.19.16	138. 5. 0	3. 8. 7	3.12. 6		
3Q	268.19. 9	31.14. 0	13.13. 9	3. 6. 9	21. 6. 8	2. 2. 6		290. 1. 6	47. 5. 0	3. 9. 9	3. 5. 0	14. 5. 0	5. 0. 0
4Q	75.12. 9	10. 0. 0	2.13. 0	2.14. 2	16. 0		3. 0. 0	120. 0. 0					
'78-1Q	364.14. 0	34.17. 8	1.17. 3	4. 2. 7	3. 2. 0	6.11		326. 0. 0	3. 6		1.15. 0		
2Q	213. 2. 9	15.18. 3	9.16. 0	15. 6	3.16. 0	2. 6		350. 0. 0		12. 0	6.15. 0		
3Q	461.10. 7	4.10. 0	8. 4. 0	8.14. 8	8.10. 0	47. 0. 3		481.15. 0	28. 5. 0	3.12.10			
4Q	492.14. 1	11.12. 6	38.19. 0		10. 5. 9	10.12. 6		538. 5. 0	22.10. 0	2. 4. 3	3. 5. 0		35. 0. 0
'79-1Q	1041.19. 5	21.12. 6	36.10. 6			5. 0	1. 2. 6	1057.18. 3	14.10. 0	10. 3		6. 0. 0	
2Q	858. 3. 8	28. 5. 9	48. 5. 0	17. 0. 6	2.10. 0	6.15. 0		842. 2. 0	93.14. 6	49.14. 6		5. 0. 0	5. 0. 0
3Q	1041. 6. 2	20. 0. 0	17. 2. 6	10. 2. 6	8.13. 6	7.10. 0		887.10. 0		44. 9. 8	26. 0. 0		
4Q	4472. 5. 3	54.15. 0	139.13. 9	14. 7. 6	49.15. 0		137.10.10	4494.17. 6	366. 0. 0	32.17. 6	16. 0. 0	60.10. 0	
'80-1Q	6404.16. 6	11. 5. 0	164.17. 6	37.10. 0	60. 0. 0	64.17. 3		4780.12. 6		56.18. 6		2. 0. 0	6. 0. 0
2Q	12873.12.11	619. 6. 0	877. 7. 6	367.18. 9	676.10. 0	376. 0. 0		12980.13. 6	1297.10. 0	482.13. 9	697.10. 0		
3Q	8134. 9. 2	751. 2. 6	813. 8. 6	120.15. 0	70.15. 0		139.10. 0	5205.17. 6	1810. 9. 9	858. 7. 6	281. 5. 0	225. 0. 0	
4Q	17074.15. 4	2167.10. 0	391.15. 0	360.15. 0	196.17. 6		112.10. 0	18236.10. 3	4514.10. 0	376. 1. 5		533.15. 0	
'81-1Q	13919.10. 4	3112.10. 0	1140. 7. 6		118. 2. 6	236. 6. 9		13389.17. 6	2971.17. 6	438. 9. 7	205. 0. 0	212.10. 0	
2Q	8553. 2.10	647. 9. 0	923. 3. 7	149.12. 6	693.11. 3	151.17. 6	1915. 5. 1	6214. 8. 2	3147.13. 0	334.15. 1	4. 3	581. 9. 0	
3Q	183.12. 6	64.16. 9	39.19. 9	17. 7. 0	26.19. 4	9.18. 6	18. 7. 9	210. 0. 0	54.14. 8	14. 9.11	14.12. 6	19. 0. 0	
4Q	237.17. 7		29. 1. 9	1.10. 0		1. 0. 0		133. 0. 0	118. 8. 3	15. 8. 9	8. 8. 6		3.10. 0
'82-1Q	219. 9. 3	16.19. 2	13. 2. 0	4. 1. 9		7. 0. 6		167. 0. 0	79. 7. 6	4.17. 3			
2Q	403. 3. 7	54. 6. 8	24. 0. 9	13. 1. 0	3. 6. 2		3.10. 0	204.19.10	131. 4. 5	40.15. 8	9.10. 0	18. 0. 0	
3Q	210.16.10	41. 6. 0	24. 2. 3	10.13. 5	6. 0. 9	1. 0. 0		130. 0. 0	144.17.11	44. 4.10	7. 8. 0	21. 3. 0	
4Q	299. 3. 7	17.19. 0	18. 4. 8	5. 9. 5	11. 0	122.12. 2		159.10. 0	179.10. 3	18.11. 4		22.15. 0	7. 0. 0

in April 1778 fish first appears in quantity in the household accounts. On 5 January 1780, the hospital owed £1104 12s. 3d., which was paid from capital. Borrowing was necessary, and on 6 September 1780 the Managers borrowed £281 5s. from Jacob Shoemaker, one of their number. Capital expenses were deferred, and the charge in February 1781 of £118 2s. 6d. "To the Hire of a Stove" suggests that money was too scarce to buy one. During 1781 and 1782, several attending physicians contributed fees to the hospital. Things eased during 1782 when some back bills for patient board were collected, and the Overseer of the Poor began to pay board for patients who previously had been carried free. Gifts were always welcome, in cash or in kind, and on 12 October 1782 we read:

> The Proprietors of the Union Salt Works at Squan in the State of New Jersey, this day generously presented to the Hospital, 50 # Wt. of Epsom salts — the sitting Managers gave the thanks of the Board to John Kaighn (one of the Proprietors) of this donation.

SUMMARY

There were grim days at Pennsylvania Hospital during the war. The British occupation was bad, but the real enemy was inflation followed by repudiation of Continental currency. Philadelphia Quaker merchants and lawyers — because they were "publick spirited" — unflinchingly brought the hospital through inflation, privation, shortages, military occupation and reoccupation, broken windows when glass was not to be had, lack of "bed cloths" when cloth had disappeared from the market, and disruption of everything those methodical, frugal, orderly men regarded as essential. Many of their decisions must have been painful, but only a very business-like attitude brought the hospital through the Revolution and started it on the way to celebrating its 225th year as the Republic celebrated its Bicentennial.

ACKNOWLEDGEMENT

Mr. Joseph F. Toomey, Associate Administrator of the Jersey City Medical Center, made many useful suggestions, and the American Philosophical Society loaned the writer microfilms of the original records in the Archives of Pennsylvania Hospital.

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Memoir of Rachel Ash (1893-1976)

By WILLIAM J. RASHKIND, M.D.

Rachel Ash was born in Baltimore, Maryland, on April 17, 1893, and received a BA from Bryn Mawr College in 1915 and an MA from the University of Pennsylvania in 1922. From 1916 to 1921, she worked as a laboratory technician and bacteriologist. During that time she sensed that she had a gift for diagnosis, and she entered Woman's Medical College of Pennsylvania in 1922, graduating in 1926. In the remarkable medical career that spanned the next 40 years, her prescience about her diagnostic ability was proved repeatedly.

She interned at the Children's Hospital of San Francisco in 1926-27, and served a residency in pediatrics at the Children's Hospital of Philadelphia in 1927-28. After a term as physician to the Philadelphia Board of Education, she assumed the directorship of the Cardiology Out-Patient Service at the Children's Hospital of Philadelphia in 1937. Ten years later she was appointed cardiologist to the entire hospital. During the thirties and early forties, she was interested primarily in rheumatic fever, and her clinic at the Children's Hospital of Philadelphia was one of the largest in the East. When not actually providing care for affected children, she spent innumerable hours reviewing their records, tabulating her meticulous observations, and writing a series of classical articles, many of which are as fresh and meaningful today as they were forty years ago. During the same period of time, Dr. Ash cared for many children with congenital cardiac malformations, although the outcome of that care was frequently frustrating and unrewarding. In the late forties, when surgical therapy became available for many of these children, Dr. Ash had the vision and the courage to become the pioneer in Philadelphia in selecting those children suitable for surgery. It was truly remarkable to watch this delicate little lady, with little more than her nimble fingers, her sensitive ears, a chest x-ray, and an electrocardiogram, sort out these children with incredible accuracy. Few of her proteges will ever forget the sight of Dr. Ash in the operating room, sitting on a stool which kept her feet well off the ground, in a continuing dialogue with Dr. Julian Johnson, keeping step by step notes of the surgical procedure. She would continue to follow these children through their post-operative period and into their adult lives.

Sensitive and concerned as she was when it came to the welfare of her patients, she was tough as nails. The rigorous standards she set for her preceptees, she insisted upon for herself as well. Her insistence on perfection would sometimes rankle and frequently terrify her staff. What a sight it must have been to see this 90-pound dynamo lead her three early disciples (Sidney Friedman, Doane Fisher and myself, totaling some 700 pounds) on rounds quaking lest Rachel discover, as she usually did, some flaw, however minor, in the management of a child. There is a prototypal, and absolutely true, story of the day the three finally did succeed in conducting Rachel through rounds which indicated flawless patient management, only to have Rachel stop at the bedside of a child with acute rheumatic fever (Rachel was a devotee of absolute bedrest for these patients) and comment that the jigsaw puzzle that the

child was quietly doing in bed — had too many pieces! Yet we all realized that her meticulous attention to detail often was the difference between life and death for a critically ill infant who had no margin for any error.

Dr. Ash belonged to many professional societies, but her interests were protean. She was elected a Fellow of the College of Physicians of Philadelphia in 1952. She was a member of a number of liberal political organizations including SANE, Common Cause, the New Democratic Coalition, and the World Affairs Council. She was active in the Fellowship Commission and the A.C.L.U. She was also a member of the Academy of Natural Sciences and the Philadelphia Museum of Art.

In 1958, the Woman's Medical College recognized her by awarding her its Alumna Achievement Award. One year later, the State of Pennsylvania honored her with the coveted "Distinguished Daughter of Pennsylvania" award. Rachel's real reward was the first smile of a recuperant child, a sign that she considered to be prognostic of eventual recovery. Although she treated awards with disdain, the wording of the Achievement Award of the Woman's Medical College of Pennsylvania is a fitting summary of her career: ".....in proud recognition of her distinguished attainment as pediatrician, cardiologist, teacher and leader in investigative cardiology. She has served her profession with distinction and brought high honors to her Alma Mater and to women in medicine."

Memoir of Claude Passmore Brown (1875-1976)

By ROBERT F. NORRIS, M.D.

Claude Passmore Brown, a Fellow of the College of Physicians since 1932, died on June 10, 1976, in his 101st year, at the Rydal Park Medical Center near Philadelphia. A long time clinical pathologist, he had only recently retired from his chosen specialty.

Dr. Brown was born in Mahanoy City, Pennsylvania, on October 24, 1875. He completed his high school education in that city and then came to Philadelphia for the study of pharmacy. He became a Registered Pharmacist in 1900, and practiced that profession before entering Temple University School of Medicine, from which he was graduated in the class of 1911. At the time of his death he was the oldest living alumnus of that University, and he is thought to have been the oldest Fellow of the College of Physicians.

In the early years of his practice he became attracted to those areas of medicine which are now considered clinical pathology and clinical microbiology. He became assistant director of the Mulford Biological Laboratories in Glenolden, a post which he held from 1912 to 1917. He served in the United States Army as a major from 1917 to 1919 and was chief of the laboratory service at various army hospitals. He reached the rank of lieutenant colonel before his eventual retirement from the Service. Following that war he was associate director of Gilliland Biological Laboratories from 1919 to 1922 and became clinical director of the biological laboratories of the National Drug Company in 1926 to 1941. He was assistant director and then director of the Pennsylvania Department of Health Laboratory from 1941 to 1948. For many years, until his retirement from active practice in 1971, he was the director of his own laboratory in Philadelphia.

Dr. Brown was certified in pathologic anatomy and clinical pathology by the American Board of Pathology. He was an S. Weir Mitchell Associate of the College of Physicians of Philadelphia. In addition to our College, Dr. Brown was a Fellow of the College of American Pathologists and of the American Public Health Association. He was an honorary member of the Pennsylvania Public Health Association and held the Diploma of Honor of the Association of Clinical Scientists. He was a member of numerous other medical societies.

During his earlier years of practice he was especially interested in a number of investigations in clinical bacteriology and serology. In much of this work he was associated with Dr. John Kolmer and Dr. A. Parker Hitchens. He also carried out clinical investigations in prophylactic immunization against typhoid fever and the effectiveness of tetanus toxoid as prophylactic therapy.

During his long and active life Dr. Brown acquired a great many close and sincere friends in the medical profession. His friendly, quiet, and sincere manner in all his relationships attracted to him both fellow pathologists and clinicians who depended upon his laboratory for tests on patients in their private practices. He was one of the pioneers in Philadelphia in independent laboratory practice.

In 1900 Dr. Brown married Carrie Van Horn, who predeceased him. Surviving are a daughter, Mrs. Claudia Wilson, two grandchildren and two great-grandchildren.

Memoir of Burton Chance, Jr. (1912-1976)

By JESSE T. NICHOLSON, M.D.

Dr. Burton Chance, Jr., leaves a remarkable career dedicated to the care of crippled children. His wife and a sister survive him, and two daughters from his first marriage, Mrs. Muriel Gegler and Ann Galloway. He began his orthopedic work as a specialist in the care of children afflicted with poliomyelitis. He first became interested in orthopedics while serving as an intern at Pennsylvania Hospital. His routine visits to the clinic promoted skill in the application of plaster casts and inspired his study of biomechanics. This encouraged his interest in children afflicted with such neuromuscular conditions as poliomyelitis, cerebral palsy, Erb's palsy and myelomeningocele. He became associated with The Home of the Merciful Saviour in 1943 and served as executive medical director from 1964 on. In the latter part of his career, he specialized in cerebral palsied children and was co-author, with Eugene T. McDonald, Ed. D., of the book *Cerebral Palsy* for the Foundation of Speech Pathology Series.

Burton Chance was born in 1912 and grew up in Philadelphia. He was a graduate of Episcopal Academy, St. John's College in Annapolis, Maryland, and the University of Maryland School of Medicine. He served his internship and residency at Pennsylvania Hospital. His orthopedic training was obtained at the Philadelphia Orthopaedic and Graduate Hospitals, and the Children's Hospital of Philadelphia. Dr. Chance's wife, the former Jean Morse, had a nursing career at Children's Hospital where she was chief anesthetist, and continued her enthusiastic interest in the Children's Hospital where Dr. Chance was associate surgeon and associate physiatrist in the Division of Orthopedics. He was also an associate professor of orthopedic surgery at the University of Pennsylvania School of Medicine, and assistant orthopedic surgeon at the Graduate Hospital of the University of Pennsylvania. Besides being the executive medical director of The Home of The Merciful Saviour, where he and Mrs. Chance lived in a house on the grounds, Dr. Chance was medical director of The Methany School in Peapack, New Jersey.

The roster of Dr. Chance's affiliations is indeed impressive. He had been a Fellow of the College of Physicians of Philadelphia since 1955. He was a board member of the Pennsylvania School for the Deaf in Philadelphia and of The Methany School, Peapack, New Jersey. He was orthopedic consultant to an astonishing number of organizations: the Delaware County Chapter, National Foundation March of Dimes; Inglis House, the Home for Incurables in Philadelphia; the Upsal Day School for Blind Children and The Widener Memorial School for Crippled Children, both in Philadelphia. Further afield, Dr. Chance's consultations ranged to the Cerebral Palsy Development Center of Northern Virginia at Falls Church, the District of Columbia Society for Crippled Children, and the Wheeling (W.Va.) Society for Crippled Children. In Pennsylvania, he was consultant to the Easter Seal Societies of Allegheny, Blair, Centre, Clearfield, Fayette, Lancaster, and Mifflin Counties, the Lehigh Valley Society for Crippled Children, the Crippled Children's Association of Hazleton and Vicinity, the Wyoming Valley Crippled Children's Association, the Lycoming County Crippled Children's Society, the

Easter Seal Society for Crippled Children and Adults of Philadelphia, Bucks, Montgomery, Delaware and Chester Counties (five treatment centers), Southwestern Pennsylvania Easter Seal Society, and York County Society for Crippled Children.

At its Fiftieth Anniversary Convention, the Pennsylvania Society for Crippled Children and Adults presented its Humanitarian Award to Dr. Chance. The citation read:

"As a nationally recognized pioneer in the field of Cerebral Palsy, you provided the only specialized medical consultation that was available in many local communities long before other physicians became interested in treating such complex disabilities. You travelled extensively as a consultant to large and small communities — treating thousands of children — training great numbers of therapists and professional staff, and influencing many local physicians to learn more about the neurologically involved child. Your many years of service on the state and local advisory committees laid the very foundation for the Easter Seal Service Programs of today. Grateful parents, patients, appreciative professionals, and volunteers are proud to honor you as a loyal friend and true humanitarian with this plaque."

Dr. Chance had an excellent rapport with children and their parents. His gracious greeting of families promoted their children's confidence in his sincerity and ability. His manner of picking up a child and sitting beside him on the examining table was a further warm gesture of friendship to the new patient. He quietly explained to the parents the child's physical disability and the treatment plan prior to possible surgery or a long and complex period of therapy or institutional care. His loving patience and unmatched dedication to children with cerebral palsy certainly qualify Burton Chance as the most important single influence in the development of care of the neurologically afflicted children in Philadelphia and all its environs, indeed in much of the state of Pennsylvania and beyond its borders. The example of Burton Chance's accomplishments and life should continue as an inspiration to all those who endeavor to help crippled children and strive to improve the methods and institutions concerned with their care.

Memoir of Frank Weger Konzelman (1894-1977)

By HILTON S. READ, M.D.

Frank Weger Konzelman was a distinguished pathologist, inspirational teacher, loyal friend, valid image of the "good physician," green thumb gardener, and skilled wood worker. In addition he was a concerned citizen whose time and talent were in persistent demand as a speaker in support of many meritorious programs.

He was born in Philadelphia on May 6, 1894, and graduated from Philadelphia Central High School in 1915 and from Jefferson Medical College in 1919. He interned in St. Mary's Hospital. He was an assistant in pediatrics at Jefferson Medical College in 1920-22 and rose to professor of pathology at Jefferson between 1922 and 1930, when he transferred to Temple University Medical School. He remained at Temple until 1949, becoming professor of clinical pathology. He was a diplomate of the American Board of Pathology and a member of numerous local, state and national specialty groups, and had been a Fellow of the College of Physicians of Philadelphia since 1936. At one time he was president of the American Society of Clinical Pathologists. He was a member of the United States Naval Reserve for seventeen years.

Dr. Konzelman published numerous articles and papers on laryngeal and bronchial cancer and on liver function, and was a contributing editor of the *Encyclopedia of Medicine*(Kolmer and Boerner). In addition to his academic positions he was, at various times in his career, pathologist at Atlantic City Hospital, Shore Memorial Hospital in Somers Point, New Jersey, Mercy Hospital in Sea Isle City, New Jersey, and Washington Emergency Hospital, Washington, D.C. He had been consulting pathologist at St. Christopher's, Northwestern General, Philadelphia General, Episcopal and Anderson Hospitals in Philadelphia.

His tenure of directorship was not always highlighted by interdepartmental tranquility, but was always marked by professional validity, personal integrity, and a simmering indignation for mediocrity at any professional staff or management level. He was frequently in administrative hot water, but he seldom got burned!

Dr. Konzelman died at The Masonic Home in Elizabethtown, Pennsylvania, on February 6, 1977.

His impact on the life and career of many physicians was significant. He was appreciated by a host of the profession including the author of this memoir.

Memoir of Johannes F. Pessel (1894-1977)

By HENRY L. BOCKUS, M.D.

Soon after Johannes Pessel arrived in the Trenton area in 1924 as school physician at the Lawrenceville School, he sought and obtained an academic connection with the University of Pennsylvania. He became associated with the Graduate School of Medicine in the Department of Gastroenterology in the late 20s, being advanced to the rank of associate professor of medicine. During the many years thereafter, he journeyed from Trenton to the Graduate Hospital once, and more often twice, a week to participate in the gastroenterology conferences and in the teaching of graduate students. Proficient in the entire area of clinical gastroenterology, he was the acknowledged expert in the sigmoidoscopy procedure.

Born in Sutter, Illinois, he was the son of the Reverend Otto and Mrs. Clara Gierman Pessel. He received his baccalaureate and doctor of medicine degrees from Washington University, St. Louis. He served his internship and residency at Johns Hopkins Hospital. In 1924, he became school physician at the Lawrenceville School and in 1929 began private practice in Trenton. In spite of a number of heart attacks, he continued to practice to within a few days of his death.

Throughout these years Johannes Pessel was one of my closest friends. Our professional contacts were intimate, serving the same cause at the Graduate Hospital. We enjoyed fishing and hunting together on many occasions, although in such competition, Bockus was always on the losing side. I was privileged to supervise his marriage, being responsible for introducing him to his bride, Ruth Ibbotson, while on a trip to Hawaii. This marriage resulted in the arrival of a lovely daughter, now Mrs. Ruth Lyn Pessel Riedel.

At home base in Trenton, Johannes became chief of staff and head of the Department of Medicine and Gastroenterology at the Mercer Medical Center. Academic medicine was his forte — he was an outstanding teacher and author of many medical articles, and a frequent contributor to medical text books. He was a respected member of all of the prestigious medical associations of his specialty in this country, including the American Gastroenterological Association and the American College of Physicians. At the time of his death, he had been a Fellow of the College of Physicians of Philadelphia for thirty-seven years.

In medical practice he was of the "old school." The patient always came first in his daily activities, and his practice was indeed a most active one.

Johannes Pessel was labeled by his male colleagues as a "regular guy" — genial without boasting, friendly but not effusive, always modest and thoughtfully kind. He was a Presbyterian Christian and a life long member of the Prospect Street Presbyterian Church in Trenton.

Johannes has left the greatest legacy in existence. He has left a part of himself to stay in the hearts of his friends everywhere, a legacy all of us who knew him will cherish throughout life.

Memoir of Edmund B. Spaeth (1890-1976)

By GEORGE L. SPAETH, M.D.

Edmund B. Spaeth attended memorial services only on rare occasions. Surely this was in no way ever a reflection of disrespect for the deceased. Rather, he was, I believe, so distressed by the service, which usually diminished the dead person by removing his or her wholeness, that he preferred to stay away. His preoccupation was with life, not death.

It has seemed proper to allow time to pass before writing of Doctor Spaeth's death, which occurred August 18, 1976, after a brief illness which took him from his medical practice. For now the matter is history, a subject with which he was fascinated. As history, the event can be looked at more dispassionately and perhaps serve to make our present lives more meaningful.

Doctor Spaeth was born in 1890 in Webster, New York, but moved later to Tonawanda, a suburb of Buffalo. His forebears, German and Swiss, had been ministers, teachers, musicians. His stern home life with his seven brothers and sisters was strongly directed toward self-sufficiency and accomplishment. As a boy he became fast friends with Henry Link; Henry's family, also German and Swiss and of modest means but remarkable talents, provided him warmth and later a source of apparently unending support, his wife, Lena Maria Link.

At the age of sixteen he rejected his father's request to enter the ministry, a decision that carried with it the loss of the privilege to finish high school in routine fashion. Though already working in the evenings to help support his family, by doubling up on courses he was able to graduate early. Night school courses and work at Boyce's grocery store and later the Pierce Motor Car Company permitted the accumulation of enough credits and cash to start several years later at the University of Buffalo Medical School. The quotation beside his graduating Medical School yearbook picture said, "A little furnace, heated hot in a moment." The sensitive generosity of several employers and older physicians made it possible for him to continue in medical school, though he largely supported himself by working nights and weekends. Then came a long stint in the Army, starting at the Army Medical School, going to the front lines in France during the First World War, and then back to Walter Reed Army Medical Center where he became the first chief of ophthalmology and quite literally founded the entire field of ophthalmic plastic surgery, symbolized by the publication of the first book of the same title in 1927.

The same year Doctor Spaeth moved to Philadelphia, which introduced him into the private practice of ophthalmology and the development of a life largely occupied by caring for patients and teaching. As head of the Department of Ophthalmology at the Graduate School of the University of Pennsylvania he established a post-graduate training program in ophthalmology somewhat similar to that in Vienna where he had spent a short time after the First World War. His course became extraordinarily popular, and encompassed such touches as having the final oral examinations in his study at his home in Mt. Airy, followed by a banquet for all (and thereafter often poker as well). His surgical schedule was dazzling from

the point of view of technique, volume, difficulty and diversity of cases. In 1939 he published his major text, *Principles and Practice of Ophthalmic Surgery*, the first internationally accepted textbook on this subject, and the standard for many years by which subsequent texts on ophthalmic surgery were to be judged. His intensely busy life brought with it a variety of honors as by-products. He was a founder of the American Board of Plastic Surgery in 1939, and the American Society of Ophthalmic and Plastic and Reconstructive Surgery in 1970. Among his many other activities, he was a Fellow of the College of Physicians of Philadelphia for almost half a century.

Omitted from this historical narrative has been a most essential element of Doctor Edmund Benjamin Spaeth, specifically his ebullient, almost uncomfortably honest, fiery spirit that simply refused to be concerned with pettiness and that came to symbolize in a tangible way for his family, his friends, and his patients the healing power of enthusiastic joy. A brief sentence from one of his favorite books, Job, characterized him well: "He sayeth among the trumpets, Ha Ha!"

E. B. Spaeth's ashes are scattered under the green pines on the lee side of his summer home on Squirrel Island, Maine. His spirit, although also scattered, remains intact as a continuing source of inspiration and delight.

Memoir of N. William Winkelman, Jr. (1921-1977)

By SAMUEL B. HADDEN, M.D.

On March 9, 1977, at the age of fifty-six, Doctor N. William Winkelman, Jr., died. During his relatively brief career in the field of neurology and psychiatry he rose to heights and made contributions of which his illustrious father, Nathan W. Winkelman, would have been proud.

Doctor Winkelman was born in Philadelphia and graduated from Friends Select School and Ursinus College before entering the University of Pennsylvania School of Medicine, from which he graduated in 1945. It was my privilege to have taught Dr. Winkelman and to have exposed him to group psychotherapy in school and during his internship at Blockley, where he did outstanding work.

After completing his internship he went to New York for his residency at the New York Neurological Institute of Columbia Presbyterian Medical Center as well as at Mt. Sinai Hospital, where he served as chief resident on the Neurological Department.

Upon his return to Philadelphia he entered private practice and taught in the Department of Neurology at his alma mater. With his excellent training in both neurology and psychiatry Dr. Winkelman's interest in psychiatry soon became dominant. His early research in the use of phenothiazines was a very significant contribution, as a result of which he became a research consultant to Smith Kline and French Laboratories.

In addition to private practice he became affiliated with the Sidney Hillman Medical Clinic and served as head of the Department of Psychiatry and Neurology, where he used group psychotherapy in the treatment of a variety of disorders. Until his fatal illness he was an astute clinical investigator and a prolific writer. He was active in local psychiatric and neurological societies as well as a member of the American Group Psychotherapy Association, the American Society of Group Psychotherapy and Psychodrama, the American League Against Epilepsy, the Multiple Sclerosis Society, and other state and national medical societies. He had been a Fellow of the College of Physicians of Philadelphia since 1957.

He is survived by his wife, his mother, and three children who, like his legion of friends, miss him but cherish the privilege of having had him as an inspiring spouse, son, father and friend.

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The First Century of Osteopathic Medicine in the United States of America*

By SHERWOOD R. MERCER, A.B., A.M., LL.D.†

The profession of osteopathic medicine was founded in the latter half of the 19th century. It had its beginning on the frontier. Its founder was Andrew Taylor Still, M.D. (Figure 1).

When Still announced his theories in 1874, the medical profession was in a state of confusion. Leon E. Page, D.O., points out in his volume *The Principles of Osteopathy,* published in 1905, that "the tubercle bacillus would not be identified for eight years. Lister, then in his prime, was trying to introduce antiseptic surgery against much conservative opposition. The use of diphtheria antitoxin and the x-ray would not be introduced for another twenty years. Pasteur, then fifty-four years of age, had established the germ theory of disease only ten years before. Osler, a young man of twenty-five, was beginning his work as a professor at McGill University. Another twenty-five years would pass before Harvey Cushing would bring the first blood pressure instrument to the United States. Yet with none of these advantages, Still worked out a system of practical structural therapeutics which subsequent discoveries have progressively confirmed and never invalidated."

Fig. 1. Dr. Andrew Taylor Still, 1828-1917. Photograph taken in the 1890s or early 1900s.

*Presented before the Section on Medical History of the College of Physicians of Philadelphia, January 12, 1977.

†Professor Emeritus of the History of Medicine and Osteopathy, Philadelphia College of Osteopathic Medicine, Philadelphia, Pennsylvania 19131.

THE MAN

What kind of man was Andrew Taylor Still?

He was born on August 6, 1828, near Jonesville, Lee County, Virginia. His father, Abram, was a physician, minister and frontiersman. Like many families of that era, the Still family followed the opening and westward progress of the frontier. In 1834, for example, a move was made to New Market in eastern Tennessee, where Andrew and his two brothers attended elementary school at what was called Holston College.

Abram Still was a missionary of the Methodist Episcopal church. In 1837 he was assigned by the Methodist Episcopal Conference of Tennessee to go as a missionary to Missouri. Young Andrew took to frontier life with great enthusiasm. His early schooling was spotty. He was, however, under the constant influence of his father and mother, and books were made available to him — particularly his father's medical books. He accompanied his father not only when he was pursuing his missionary duties, but also when he went to see patients. Young Andrew thus was raised to meet the exigencies of frontier life and at the same time given a strong religious orientation. Both of these experiences shaped him for his subsequent career. Both keep reappearing throughout his life.

Still ends the section of his autobiography which deals with his boyhood thus:

> I will conclude this chapter of my boyhood experience with an incident which, simple as it was, may be said to be my first discovery in the science of osteopathy. Early in life I began to hate drugs.
>
> One day, when about ten years old, I suffered from a headache. I made a swing of my father's plow-line between two trees; but my head hurt too much to make swinging comfortable so I let the rope down to about eight or ten inches off the ground, threw the end of a blanket on it, and I lay down on the ground and used the rope for a swinging pillow. Thus I lay stretched on my back, with my neck across the rope. Soon I became easy and went to sleep, got up in a little while with headache all gone. As I knew nothing of anatomy, I took no thought of how a rope could stop headache and the sick stomach which accompanied it. After that discovery I roped my neck whenever I felt those spells coming on. I followed that treatment for twenty years before the wedge of reason reached my brain, and I could see that I had suspended the action of the great occipital nerves, and given harmony to the flow of the arterial blood to and through the veins, and ease was the effect, as the reader can see. I have worked from the days of a child, for more than fifty years, to obtain a more thorough knowledge of the workings of the machinery of life, to produce ease and health. And today I am, as I have been for fifty years, fully established in the belief that the artery is the father of the rivers of life, health and ease, and its muddy or impure water is first in all disease.[1]

This statement is not composed in the manner of modern scientific writing. Still knew this, for, as he points out,

> When the reader of this imperfectly written book of my life peruses its many pages, he will find a great many subjects written after my style, which may not appear in that polished manner of a professional book writer. The style may appear harsh and crude; if so, I will offer only this as an apology: it is spoken after my manner and custom of speech.

As his speech was shaped by his environment, so was his mind. He lived close to nature. His father taught him how to hunt and fish, and taught him how to observe — to see when he looked. He learned, when skinning animals and birds he had shot, to observe anatomical details. He watched animals as they lived in sickness and in health. The human company he lived with was in the constant presence of disease and death. Here again Andrew's father taught him what medicine could and could not do, and what the roles of religious belief and action were.

The elder Still continued his medical practice and preaching in a growing population without any major interruptions until 1844. The issue of the position of the Methodist Episcopal church on slavery did start to change things in that year. The church was divided into Northern and Southern factions. Dr. Still refused to go with the new church because he did not believe that "human slavery was of Divine origin." As a result he was assigned as missionary to the

Shawnee Indians in Kansas.

On January 29, 1849, Andrew married Mary M. Vaughn and set about establishing his own home and farm. In 1857 he was elected to the Kansas Legislature. These were exciting times in frontier history. The central question was whether Kansas would come into the Union as a free or slave state.

A confrontation took place in Lawrence. Still led the anti-slavery group. They were accosted by a pro-slavery group led by Judge Elmore, who demanded to know where they were from and what they wanted. Things began to get tense and the language became quite emphatic. When a Massachusetts man named G.F. Warren, fearing for Still's life, drew him aside, Still showed him that he had two Colt revolvers in his inside pockets. We turn again to Still's own words:

> Leaving Warren, I went back to the pro-slavery men, whose numbers had been reinforced by several additionals, among them Colonel Young. The Colonel wore a meat-knife or what people not accustomed to polite language would call a "bowie" in his belt. A glance showed me that Warren was watching me with considerable anxiety from the corner. I took care to keep the pro-slavery men in front while talking to them. Young in a milder tone than any of the others had used asked:
>
> "What do you expect to accomplish in this assembly anyway?"
>
> "We propose to break every link in the pro-slavery chain, and do all Jim Lane requires, to make Kansas free from master and slave."
>
> They grew boisterous, and Judge Elmore became insulting. I looked him in the face and said:
>
> "The angels are coming. The Lord is on our side, and His angels will soon be with us; then you will hear music from on high!" One of the gentlemen said:
>
> "Listen to the damned fool; he is crazy." I answered:
>
> "I am not crazy, Judge," then looked at my watch, which had been set the evening before to correspond with the watches of our friends. It lacked two minutes of the time designated. I said:
>
> "I can almost smell the breath of the angels. I hear the rustling of their wings." To which Elmore cried:
>
> "The damned fool is either drunk or crazy; what is the matter with him?"
>
> His deep-toned voice, trained to command negroes when he rawhided them, had scarce died on the air, when:
>
> Boom! boom! boom! went the big bass drum, the fifes' shrill shriek rose on the air.
>
> "What the hell is that?" roared Judge Elmore. "That is the music of the Lord's cavalry coming to help us knock the shackles from every slave."[2]

And, of course, as Lane's column came in, the pro-slavery group ran. That night another confrontation took place when the now organized antislavery group attended a session of the Pro-slavery Constitutional Convention. Using Still's own words again we find:

> The pro-slavery men were very quiet and their proceedings quite orderly. We listened to them for about thirty minutes, when a member began a tirade upon us, denominating us as the sons of feminine dogs, prefixed by a number of brimstone adjectives.
>
> In a moment the cup was filled and running over. Captain Walker, of our side, leaped to his feet and yelled — "God damn you, take that back!"
>
> I looked about and was surprised to find in addition to my own revolvers five hundred more covering every drop of pro-slavery blood in the house, from the Chairman down.
>
> Well, there was no shooting. Order was finally restored. When the legislature finished its work in 1858 Kansas had a new territorial law and on its way to admission to the Union as a free state.[3]

Still returned to his home, to practice medicine and saw lumber. These activities, along with legislative duties, occupied him from 1856 to 1860. But there were rumbles of war.

Still enlisted in the Ninth Kansas Cavalry in September of 1861 at Fort Leavenworth. On May 15, 1862, he was commissioned captain of Company D of the Eighteenth Kansas Militia. He rose to the rank of major and continued in service until October 27, 1864, when he received orders to disband his command.

But tragedy struck. An epidemic of spinal meningitis spread desolation. Still lost three children. He writes of this without rancor or criticisms of medical practice:

> I had great faith in the honesty of my preacher and doctors then, and I have not lost that faith. God knows I believe they did what they thought was best. They never neglected their subjects, dosed, and added to and changed doses, hoping to hit upon the defeat to the enemy; but it was of no avail.[4]

Out of the question "why?" arose the motivation which set Still on the road to

develop his ideas further and to develop practical methods of applying his theories.

He continued to farm, practice medicine and study.

As he writes: "On June 22, 1874, I flung to the breeze the banner of Osteopathy."[5] His next step was to try to get his ideas formalized and presented in an educational program.

Dr. Still, his father and two brothers had, in 1858, given 480 acres of land to the Methodist Episcopal Conference for the purpose of establishing a university. Still, his brothers, and two men named Barricklow "purchased and erected a forty-horse power steam sawmill, and sawed all the lumber for the university and other buildings" in Baldwin, Kansas. He writes:

> I was ground agent of the work, and was five years engaged in sawing, building, and doctoring the sick through small-pox, cholera, and all fevers, and representing the people of Douglas County in the Kansas legislature, during which time we washed and ironed the last wrinkle of human slavery out of the State.... I was called a good doctor, a faithful legislator, a sober, sound and loyal man, abounding with truth and justice and a heart full of love to all. But alas, when I said, "God has no use for drugs in disease, and I can prove it by His works"; when I said I could twist a man one way and cure the flu, fever, colds and the diseases of the climate; shake up a child and stop scarlet fever, croup, diptheria, and cure whooping cough in three days by a wring of its neck, and so on, all my good character was at once gone. You would have been ashamed of man or any other animal with two legs if you had heard the prayers that were sent up by men and women to save my soul from hell. When I asked the privilege of explaining osteopathy, in the Baldwin University, the doors of the structure I helped build were closed against me.[6]

This event is crucial in the history of osteopathic medicine. In effect, the decision set the mold for the development of colleges of osteopathy outside the university system. This situation shaped the development of the profession in all its aspects.

By May of 1875 Still and his family were settled in Kirksville, Missouri. He established his practice and intensified his studies in anatomy, physiology, chemistry and mineralogy. He traveled throughout the region caring for patients. But as he continued his successes, the attacks and persecutions — from both medical and non-professional quarters — were increasing.

Characteristically Still fought back, held his ground and stuck to his belief. He had spent years in the study of anatomy, robbing Indian and other graves to obtain cadavers. He was increasingly successful in his practice. His reputation was spreading. His knowledge of the clinical application of basic scientific knowledge deepened.

Naturally, inquiries began to come in and men and women asked to be given instruction in the application of osteopathic principles. When asked what osteopathy was, he replied.

> ....you look in the medical dictionary and find as its definition, "bone disease."
>
> That is a grave mistake. It is compounded of two words, *osteon,* meaning bone, *pathos, pathine* [*sic*], to suffer. Greek lexicographers say it is a proper name for a science founded on a knowledge of bones. So instead of "bone disease" it really means usage![7]

On the same subject Still wrote in the 1902-3 catalogue of the American School of Osteopathy as follows:

> I had worked and tried to reason that a body that was perfectly normal in structure could keep a man in full enjoyment of health just as long as the body was perfectly normal. On that conclusion, I worked first to know what was normal in form and what was not normal; then I compared the two in disease and in health. I found by hard study and experimenting that no human body was normal in one form whilst harboring any disease, either acute or chronic. I got good results in adjusting these bodies to such a degree that people began to ask what I was going to call my new science.
>
> I listened to all who thought I ought to name my new science, so I began to think over names, such as Allopathy, Hydropathy, Homoeopathy and other names, and as I was in Kansas when the name Osowatomie was coined, by taking the first part of the word Osoge, and the last part of Pottawattamie, and the new word coined represented two tribes of Indians, I concluded I would start out with the word as (bone) and the word pathology and press them into one word — Osteopathy.
>
> I wanted to call my science Osteopathy, and I did not care what Greek scholars said about it.[8]

When it came to instruction, Still knew that his theories and methodologies could be taught because he had succeeded in doing this

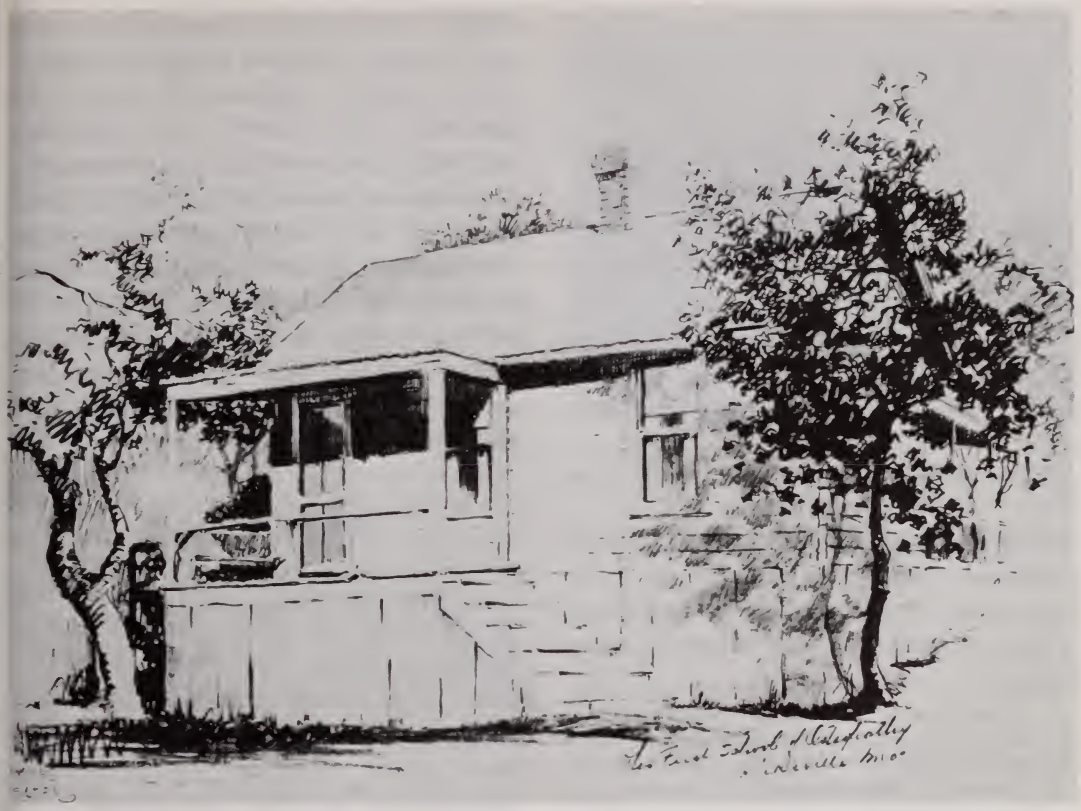

Fig. 2. The first school of osteopathic medicine was a frame cottage; the first class enrolled in 1892. In March 1894, diplomas were awarded to 18 graduates.

with members of his family.

He determined to establish a college.

In this he was aided by a Scottish physician, William Smith, M.D., a graduate of Edinburgh, who was appointed to teach anatomy. The first classes were held in November of 1892 in Kirksville (Figure 2, 3). The objective of the school was set forth as follows in a second charter issued on October 30, 1894:

> ....to establish a college of osteopathy, the design of which is to improve our present system of surgery, obstetrics and treatment of diseases generally, and place the same on a more rational and scientific basis, and to impart information to the medical profession, and to grant and confer such honors and degrees as are usually granted and conferred by reputable medical colleges; to issue diplomas in testimony of the same to all students graduating from said school under the seal of the corporation, with the signature of each member of the faculty and of the president of the college.[9]

As Dr. George W. Northup has pointed out, Still set out to reform medicine. Like all reformers, he had his troubles, particularly with the then "medical establishment."

Still was criticized not only for his ideas on what and how medicine should be taught and practiced, but also because he made admission to his school open to Negroes. He also admitted women — and what a hue and cry that raised! Nevertheless, he held fast. As he expressed it himself:

> To me they have proven that if man is the head of the family, his claim to superiority must be in strength of his muscles and not the brain.
>
> The women have done well in the classes, clinics and practice, and are as well worthy of diplomas as any gentleman who ever entered the portals of the American School of Osteopathy.[10]

Still always insisted that osteopathic physicians must have a sound educational

Fig. 3. The second home of the American School of Osteopathy in Kirksville, Mo., completed by the late 1890s.

foundation (Figure 4). He was constantly concerned that people who claimed to be Osteopaths and were not well-educated would do the profession grave damage. As he wrote:

> One objection to osteopathy is that it may make thieves and scoundrels. Some men come here for a little while and go away and say, "I have been to Kirksville; I am an Osteopath!"[11]

Clearly then the only course was to establish colleges. Still was a frontier liberal. Outspoken, practical, and of single-minded purposiveness, he was no dogmatist. In part because of the language in which his ideas were couched, he has often been misinterpreted, misunderstood, and maligned. He knew that knowledge of the scientific basis of his ideas and their application was crucial. He made no Messianic claims. He did insist that an osteopathic physician worthy of the name must know what he or she is doing.

Soon graduates of Kirksville were establishing other colleges. Colleges were established in Philadelphia in 1898; Des Moines, Iowa, in 1898; Chicago in 1900; and Kansas City, Missouri, in 1916. By the time of the Flexner study there were 31 places of instruction which claimed to be colleges of osteopathic medicine. Dr. Flexner's report brought about the closing of many medical colleges. Osteopathic colleges had the same experience. Only the five colleges cited above survived; they continued to serve the profession until 1964 when the first university-based college of osteopathic medicine was established at Michigan State University. Since then other university-based colleges have been established in Texas (chartered in 1966, first class admitted in 1970), Oklahoma in 1972, West Virginia in 1974, and Ohio in 1975. Three others are now actively being organized in New Jersey, New York and New England.

THE PROFESSION

In the development of its organizational life the osteopathic profession, like the allopathic profession, followed the federation pattern; that is, local (county or area) societies, state societies, and a national society. The first meeting to establish the American Association for the Advancement of Osteopathy was held in Kirksville, Missouri, on February 6, 1897. What was in effect the first meeting of the American Osteopathic Association was held in Kirksville on April 19 of the same year.

The Constitution sets forth the objects of the Association as follows:

> "The objects of this Association shall be to promote the public health, to encourage scientific research, and to maintain and improve high standards of medical education in osteopathic colleges."

Fig. 4. Osteopathic students in the bacteriology laboratory of the American School of Osteopathy, Kirksville, in the early 1900s.

It should be noted that the American Osteopathic Association is not organized as a trade association. The control of all associational affairs rests with the House of Delegates working through a Board of Trustees. For example, the accreditation of all educational programs, from day one of the predoctoral program through the last day of the residency, is a function of the A.O.A.. The specialty Colleges and the American Association of Colleges of Osteopathic Medicine have advisory powers.

The specialty Colleges cannot certify. They can only recommend certification to the Board of Trustees and the House of Delegates. The association's college-accrediting responsibility lies with the Committee on Colleges of the Bureau of Professional Education. This permits the Board of Trustees to function as an appeal body.

What is now the American Association of Colleges of Osteopathic Medicine was organized at a meeting held in Kirksville on June 28 and 29, 1898, as the Associated Colleges of Osteopathy. This association was a major force in maintaining high standards in osteopathic education. As a result of its efforts weak schools were closed or merged and systematic review of the profession's educational activities was instituted.

Colleges of Osteopathic Medicine until 1964 were all private, independent schools. They received no financial aid from any local, state or national government until after World War II. Hence, because of the struggle the profession was having in its development, in the face of both civil and medical politics, the colleges had to husband their resources as best they could and concentrate these in support of their educational programs. This meant that research suffered. There has always been some research in osteopathic colleges, but its role was smaller than in allopathic schools. From the establishment of Kirksville, the curricula in osteopathic colleges have offered instruction in the standard medical school subjects.

The honor of passing the first law legalizing the practice of osteopathy goes to Vermont. The bill was passed by both houses of the legislature and signed by the governor in one hour and fifteen minutes in November of 1896.

The law was entitled "An Act relating to the practice of Osteopathy in Vermont," and read:

> It is hereby enacted by the General Assembly of the State of Vermont.
>
> Section I. It shall be lawful for the graduates and holders of diplomas from the American School of Osteopathy, at Kirksville, Missouri, a regularly chartered school under the laws of Missouri, to practice their art of healing in the State of Vermont.

The law was amended in 1903 to include graduates of the Boston school and again in 1904 to provide for a state board of examiners.

The long struggle for full recognition in all states was ended when the bill for the licensing of Doctors of Osteopathy in Mississippi was signed by that state's governor on February 14, 1973. It is of interest to note, as an example of how things have changed, that the bill was sponsored and introduced by the Mississippi Medical Society, since there were no active members of the American Osteopathic Association practicing in the state.

In 1962, after a bitter battle, and on the basis of a referendum passed by the people of California, the licensing of osteopathic physicians was halted in that state. The California College of Medicine (formerly the College of Osteopathic Physicians and Surgeons) was converted to an allopathic school and has since become the medical school of the University of California at Irvine. Very quickly after the conversion of C.C.M., some 2,500 osteopathic physicians paid $65.00 each and received M.D. degrees. The battle was continued, however, by about

400 D.O.'s who refused to become M.D.'s. Twelve years after the battle had been lost the Supreme Court of California in 1974 voided the referendum; the Osteopathic Board of Examiners resumed the licensing of D.O.'s and a program for the re-establishment of a College of Osteopathic Medicine was begun.

Just as full licensing was a long time in coming, so too was recognition by the armed forces. Osteopathic Physicians were excluded from all activities involving the United States armed forces until almost twenty years after World War II. The drafting of D.O.'s as medical officers was begun in 1967. Now they have full recognition and appointments in all branches of the services are available to them. In 1963, D.O.'s were accepted as medical officers by the Civil Service, and in the same year the Health Professions Educational Assistance Act provided for construction grants to osteopathic colleges and for loans to osteopathic students.

Licensing may be obtained by D.O.'s in those countries around the world which have membership in the World Health Organization.

In order to provide complete care for its patients, the osteopathic profession had to build hospitals. Like its colleges, the profession's hospitals were at first financed by osteopathic physicians, but as the hospitals grew in size and number, they began to receive support from their communities and from local, state, and national governments. The great change came in 1948 with the federal Hill-Burton program and continued with the later enactment of the Medicare program.

The first osteopathic hospital, the A.T. Still Surgical Sanitarium, was opened in 1899 at Kirksville (Figure 5). It was described as having "all the appliances for the most delicate surgical operations," and its staff included three surgeons who had qualified in Scotland. It remained in use until completion of the hospital of the American School of Osteopathy in 1905. The number of hospitals has now reached 204, of which 79 are approved for intern education and 64 for residency programs. There are 23,768 beds in these osteopathic hospitals and 1,759 bassinets.

Over 99% of the graduates of Colleges of Osteopathic Medicine take rotating internships.

Fig. 5. The A.T. Still Surgical Sanitarium, opened in early 1899 in Kirksville.

Since the first class of 18 received its diplomas at the American School of Osteopathy on March 2, 1894, most osteopathic physicians have gone into general practice — some 75% or, if the current definition of first contact physicians is used, almost 90%.

Specialty education under osteopathic auspices began with the establishment of the American Osteopathic College of Radiology and the American Osteopathic Board of Radiology in 1938. There are now 16 specialty practice Colleges, each sponsoring a board of examiners. This number does not include the American Academy of Osteopathy, which confers Fellowships on an examination basis but does not certify, nor the Osteopathic College of Emergency Medicine, which is now being organized.

The Class of 1894 at Kirksville numbered 18. The Class of 1976 from all the colleges totaled 812 members. This growth has expanded the size of the profession to 15,572 in 1976.

Accompanying this growth has been a great expansion of teaching facilities and faculty. From 1892 to well past the close of World War II most college faculty members served on a volunteer basis. This kind of dedication in support of the profession provided the undergirding strength that made the development of the profession possible. At Philadelphia, for example, as late as 1954 there were only a half-dozen faculty on the payroll and their salaries were minuscule. The number of whole-time faculty currently is approaching 100. This rapid rise is reflected in strengthened teaching, increased research, constant availability of superior patient care, and the rapid development of a continuing education program.

Still believed that human beings should be treated and cared for by physicians who see each patient as a unit and that:

> Within man's body there is a capacity for health. If this capacity is recognized and normalized, disease can be prevented and treated;
>
> The structure of the body is reciprocally related to its function;
>
> Progress can be made in the study of disease if, first, a study is made of health;
>
> The body's musculoskeletal system — bones, ligaments, muscles, fascia, etc. — forms a structure which, when disordered, may effect changes in the function of other parts of the body. This effect may be created through irritation and abnormal response of the nerve and blood supply to other organs of the body;
>
> The body of a human being is subject to mechanical disorder.

These basic tenets are woven into the fabric of educational experience of all students of osteopathic medicine. The curriculum in osteopathic colleges has in general experienced changes similar to those in allopathic colleges. At the turn of the century the time required was two years. By 1905 it had been increased to three and by 1915 to four. Several osteopathic colleges now offer programs which are three calendar years of instruction, but the number of months of instruction for the three-year and four-year programs are comparable.

Likewise, premedical requirements increased from a minimum of high school graduation in 1900 to three years in an accredited college in 1958. Currently over 98% of all students admitted hold at least a bachelor's degree. All osteopathic colleges require candidates for admission to submit scores achieved on the Medical College Admissions Test.

Because osteopathic graduates must sit for licensing examinations administered in some states by a composite board of examiners, the subject matter presented in osteopathic colleges is comparable to that presented in allopathic schools, and performance standards have been maintained that will assure success in licensing examinations wherever administered.

As noted earlier, osteopathic graduates tend to go into general, family, or first-contact physician practice. They are educated to do this, for the curriculum reflects the holistic approach emphasized by Dr. Still.

THE FUTURE

One hundred forty years have passed since the boy Andrew Taylor Still made a swing of his father's plow-line to rest his aching head. The geographical frontier has disappeared. Scientific advances have burst upon the scene and have revolutionized medicine and medical care.

One hundred two years have passed since Dr. Still announced his theories and philosophy of osteopathy. Eighty-four years have passed since the first college of osteopathic medicine was founded. Seventy-one years have passed since the founding of the first osteopathic hospital. Thirty-nine

years have passed since the founding of the first osteopathic specialty College. Eighty-two years have passed since 18 graduates constituted the osteopathic profession. Yet with all the growth and change and adaptation, the basic ideas of Dr. Still are a stronger-than-ever foundation on which the profession of over 15,000 osteopathic physicians proudly stands today.

The struggle between the demands of the reductionism which characterizes current scientific developments and the necessity of seeing and treating a patient as a unit goes on in both allopathic and osteopathic colleges. This struggle is intensified by the current activities of government agencies and consumer groups.

It is well that there are two schools of practice in our society. From the earliest days of this nation people have insisted that options must be made available. Two independently organized and maintained schools of practice make it possible to keep options in medical care alive; this cannot help but be to the benefit of medicine as medicine, wherever practiced across the nation, and under whatever political, economic or social conditions.

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DISCUSSION

Though much has been written about osteopathy, most has been of a controversial nature, shedding more heat than light. Dr. Mercer has performed a scholarly service in emphasizing the need for understanding osteopathy's historical roots if we are to understand the place of this indigenously American system of medical practice in the American society in which it found its origins. Equally significantly, his conclusions underline a continuing emphasis in osteopathy upon primary and family care and, intimately related to this, a continuing theoretical emphasis upon the whole patient. The holistic framework of osteopathic theory creates a useful and instructive contrast to a rather different pattern of historical development in main-stream medicine — an emphasis upon limited parts and functions of the body in research and a parallel and not-unrelated specialism in practice. The existence of osteopathy thus serves —whether one accepts, rejects, or assumes an agnostic stance in regard to its theoretical basis — to underline this aspect of regular medicine, one indissolubly connected with its growth in knowledge and technical capability, yet connected as well with its far-from-perfect record in the provision of primary care and in dealing with the whole patient and his family. Thus the historical development of osteopathy implies the consideration of a significant dilemma implicit in the evolution of twentieth-century medicine generally. It is a dilemma which has become an increasingly

central one in the last decade, as the public and many physicians themselves have come to question the ability of medicine to provide humane care.

— CHARLES ROSENBERG, Ph.D

A Tribute to Cary F. Baynes (1883-1977)

By FRED B. ROGERS, M.D.*

Dr. Cary F. Baynes, translator of books on analytical psychology and Chinese philosophy, died on 29 October 1977 at her home in Ascona, Switzerland, at the age of 94.

During the 1920s and 30s she translated several works by the Swiss psychiatrist Carl G. Jung. Her English version of the Rev. Richard Wilhelm's German translation of the Chinese *I Ching, The Book of Changes,* completed in 1944, was published six years later by Pantheon Books, Inc., on behalf of the Bollingen Foundation, New York. In 1967, the Bollingen Series was transferred to Princeton University Press - present issuer of this thoughtful classic which is one of the world's oldest books.

Dr. Baynes, the former Cary Fink, was born on 26 September 1883 in Mexico City. Her father's work as a railroad builder had taken the family there from its home at Louisville, Kentucky. Mr. Fink was of German origin, and Mrs. Fink had been a Carter, of Virginia. Cary was graduated from Vassar College in 1906, received an M.D. degree in 1911 from the Johns Hopkins University, and performed research at Harvard University. Her first marriage, in 1910, was to Jaime de Angulo (M.D., Johns Hopkins, 1912), who had emigrated from Spain to California; he was a physician and a student of American Indian languages and folklore. Their union ended in divorce. In the early 1920s, after Cary had gone to Zurich to study with Jung, she met and married H. Godwin Baynes (1882-1943), a British psychiatrist who had translated Jung's book *Psychological Types,* and during 1925-26 joined Jung on an expedition to East Africa. H. G. and C. F. Baynes collaborated as Jung's English translators for several years.

Mrs. Baynes remained in Switzerland, continued working with Jung, and began translating the lengthy *I Ching.* At the outbreak of World War II she returned to the United States and settled in the village of Morris, Connecticut. Issuance of her rendering of the *I Ching, or Book of Changes,* was delayed by a wait for Dr. Jung to write his foreword, and again when Richard Wilhelm's son, Prof. Hellmuth Wilhelm, arrived in the United States from China and was able to check the English translation against the Chinese. The book's first edition appeared in 1950.

Cary Baynes subsequently translated Hellmut Wilhelm's own book, *Change: Eight Lectures on the "I Ching,"* which was published by Pantheon Books in 1960. She and Wilhelm, then a professor at the University of Washington, also both participated in the preparation of a new 1967 edition of the *I Ching.* This treatise consists of 64 hexagrams and their meanings. These were widely used in ancient China to foretell the future and to give practical advice. To this day, the book is consulted for such purposes. The Wilhelm/Baynes edition is the English version most esteemed by its devotees - and a best seller among scholarly publications. Pearl S. Buck, an expert on China, wrote of it in the *Saturday Review of Literature:* "To the understanding of eternal truth, as it was comprehended and expressed by one of the greatest of earth's peoples, this translation of the 'Book of Changes' is a splended contribution."

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Medicine and Natural History - Crosscurrents in Philadelphia in the Nineteenth Century*

By GEORGE E. GIFFORD, JR., M.D.†

It is a profound honor to give the first Richard H. Shryock Lecture at the College of Physicians of Philadelphia. To me, Shryock was the master. His book, *The Development of Modern Medicine, An Interpretation of the Social and Scientific Factors Involved,* inspired me to pursue the history of medicine at Harvard.

I have chosen as my topic a subject I hope would have pleased R.H. Shryock. Born in Philadelphia in 1893, Dr. Shryock received his Ph.D. from the University of Pennsylvania in 1924 and served on its faculty until 1938. He knew the city and its roots well, the institutions and personalities that we will mention.

MEDICINE AND BOTANY: THE BARTON ERA, 1789-1815

The first class was graduated from Philadelphia Medical School in 1768, having been taught courses in medicine, materia medica, and botany by Dr. John Morgan (1735-89). The next year's class was subjected to Dr. Adam Kuhn (1741-1817), who is always referred to as "old Dr. Adam Kuhn." He held the unique honor of having studied with Linnaeus in 1762-65 and of being one of the master's favorite pupils. Linnaeus perpetuated his name in *Kuhnia,* an American genus of *Compositae.* Dr. Kuhn also had the additional honor of holding the first professorship of botany in the U.S., but, since he disliked plant study, he abandoned it after one year. He continued his lectures on materia medica for 21 years, until 1789.[1]

Benjamin Smith Barton (1766-1815) became the professor of natural history and botany at the College of Philadelphia in 1789. Having studied medicine at Edinburgh, he had come in contact with the long botanical-materia medica tradition there and attempted to create a botanical Edinburgh in Philadelphia.[2]

In the Barton era, there were no full-time students of pure botany in the United States because the American culture could not yet support scientists in a single field. In the College of Philadelphia, the study of science *per se* slowly broadened from a half course in natural philosophy (largely astronomy and physics) to electives in chemistry, natural history, botany, zoology, and mineralogy for upper classmen.

The earliest teachers of science were usually physicians, because only they had received adequate scientific training, often at European medical schools. After the Revolution, as the medical school in Philadelphia gained increasing prestige and other medical schools sprang up, science grew stronger in the United States and the custom of going to Europe for medical training was gradually abandoned. The dominance of physicians in American science continued throughout the first half of the 19th century. Asa Gray, Louis Agassiz, Jeffries Wyman, John Torrey, and Joseph Leidy all had medical degrees.[3]

Botany was ancillary to materia medica, which dealt with plants used in medication. The pharmacopeia was supplied by nature, not by chemical laboratories; the country doctor gathered his "drugs" from the fields and woods and needed to recognize the growing plants as well as their uses. Benjamin

*The Richard H. Shryock Lecture, November 10, 1976.

†15 Arden Road, Watertown, Massachusetts 02172.

Smith Barton's *Elements of Botany* (1803) was the first botanical textbook published in the U.S.; it was used by his students and those of his successor for years.

Barton had a superb Philadelphia illustrator for his *Elements of Botany* in William Bartram (1739-1823). In his Preface, Barton thanked Bartram for "his kind liberality in enriching my work" and went on to say, "I sincerely rejoice to have an opportunity of declaring how much happiness, in the study of natural history, has been owing to my acquaintance with him — how sincerely I loved him for the happiest union of moral integrity, with original genius, and unaspiring science, for which he is eminently distinguished."[4] William Bartram collected plants and made drawings for Dr. John Fothergill, the Quaker physician of London who was his patron, as Peter Collinson had been a patron for his father, John Bartram (1699-1777).[5] John had introduced 100 American plant species into Europe. He stated that for a time "medicine and surgery" were his "chief study," and all of his few writings were of a medical nature. Benjamin Franklin recognized the need for a home herbal and persuaded John Bartram to prepare an appendix "containing a description of a number of plants peculiar to America, their uses, virtues, etc." for a third edition of Short's *Medicina Britannica* which Franklin published in 1751.[6] John Bartram also wrote two short pieces on snakeroot and red cedar for "Poor Richard's Almanac." It is apparent that B.S. Barton's illustrator, William Bartram, had medicinal plant knowledge from his father, John.

William Bartram, too, had other medical ties; when "old Adam Kuhn" relinquished his chair in botany, it was offered to him in 1782, but he refused. William wrote several papers for Barton's *Philadelphia Medical and Physical Journal*, and Barton regularly took his medical school classes to Bartram's gardens on the Schuykill. Clearly the crosscurrents of medicine and botany in Philadelphia were strong; in fact, they were interdependent.

B.S. Barton became the patron of two important immigrants who contributed significantly to American botany, Frederick Travgott Pursh (1774-1820)[7] and Thomas Nuttall (1786-1859).[8] Barton, hoping to produce a flora of North America, needed capable botanical assistants. Both Pursh and Nuttall needed financial support, dried plant specimens, and access to botanical books. Barton met these needs: he was the owner of the largest private natural history library of his time, and between 1797 and 1807, he assembled the largest herbarium of native plants, numbering 1,674 specimens.

Barton employed Pursh for the first extended botanical exploration of North America sponsored by an American. In 1809 Pursh took employment with Dr. David Hosack, who was developing his Elgin Botanic Garden in New York. Nuttall, too, became a plant collector for Barton, and went on a western trip with John Jacob Astor's Pacific Fur Company. He published *The Genera of North American Plants and a Catalogue for the Species to the year 1817* in Philadelphia in 1818. Later, Nuttall moved to Harvard to teach.

Barton typifies the support the Philadelphia medical profession gave to young American botanical science. He was successively professor of natural history and botany (1789), professor of materia medica (1795), and professor of the practice of physic (1813). His own writings reflect his medical interests. He edited, for the use of physicians and students at the University of Pennsylvania, the British William Cullen's *Treatise of Materia Medica* (1812), adding his own notes on the uses of American plants. Barton also embarked on, though he did not complete, his own *Collections for an Essay*

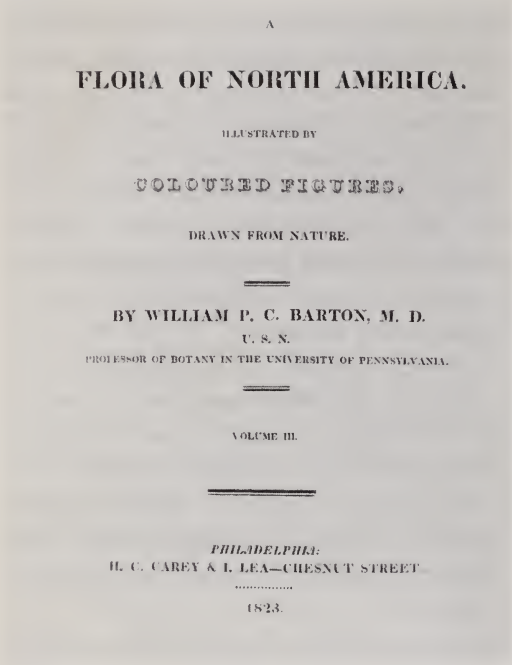
Towards a Materia Medica (1798-1804), which was completed by his nephew W.P.C. Barton as the two-volume *Vegetable Materia Medica of the United States* in 1817-18 (Figure 1).

Fig. 1. *Symplocarpus foetida* (Skunk Cabbage). Drawn from nature by W.P.C. Barton. From his *Vegetable Materia Medica of the United States of Medical Botany,* Vol. I, p. 122.

B.S. Barton was also an influential teacher. His students made important contributions to American botany. Among the more influential were William Baldwin, William Darlington, Jacob Bigelow, Charles Wilkins Short, Thomas Horsfield, Meriwether Lewis, and Eli Ives. Darlington practiced in West Chester, Pennsylvania, and produced two significant floras, *Flora Cestrica* and *Florula Cestrica.* Jacob Bigelow of Boston did the first scientific flora of New England, *Florula Bostoniensis,* and *American Medical Botany* (3 vols., 1817-20). Charles Wilkins Short, of Lexington, Kentucky, replaced Constantine Samuel Rafinesque at Transylvania, and Eli Ives spurred medical botany onward at Yale College. As has been mentioned, nephew W.P.C. Barton finished uncle B.S. Barton's *Collections for an Essay Towards a Materia Medica* as *Vegetable Materia Medica of the U.S.* (Philadelphia: M. Carey and son, 1817-18), and prepared his own *Flora of North America* (Philadelphia: H.C. Carey and I. Lea, 1821-23) (Figures 2, 3). Both Bartons devoted time and personal resources to the botanic gardens connected with the Pennsylvania Hospital.

Several notable dissertations at the University of Pennsylvania were stimulated by B.S. Barton; these included Benjamin Shultz's *Phytolacca decandra* (1795), John Moore's *On Foxglove* (1800), Thomas Massie's *Polygala Senega* (1803), and William Downey's *Puccoon or Bloodroot* (1803).

Fig. 2. *Bartonia superba.* W.P.C. Barton, *Vegetable Materia Medica,* Vol. III, plate 31. Page 311: "The genus Bartonia was named by Pursh and Nuttall in honor of Dr. Benjamin Smith Barton, a man who contributed greatly to the scientific character of our country, and to whom American Botany, particularly, is under immeasurable obligations for its early cultivation and advancement."



A

FLORA OF NORTH AMERICA.

ILLUSTRATED BY

COLOURED FIGURES,

DRAWN FROM NATURE.

BY WILLIAM P. C. BARTON, M. D.

U. S. N.

PROFESSOR OF BOTANY IN THE UNIVERSITY OF PENNSYLVANIA.

VOLUME III.

PHILADELPHIA:

H. C. CAREY & I. LEA—CHESNUT STREET

1823.

Fig. 3. Title page of W.P.C. Barton's *A Flora of North America*, Volume III.

This first period, then, has botany being supported by medicine primarily within the medical school framework. However, there was also a more general natural history effort in the American Philosophical Society.[9] Founded in 1769, it soon had a "handsome cabinet of minerals and fossils," and a botanical garden was ordered planted. The first president was Benjamin Franklin, and the first curators were Drs. Adam Kuhn and John Morgan, and Mr. Lewis Nicola. Physicians again played a major role in the natural history efforts of this society. Thomas Jefferson and Caspar Wistar were the only presidents (1797-1815 and 1815-19) between 1769 and 1865 who took a vital and personal interest in natural history matters. We will deal with them later. Among the officers of the American Philosophical Society were the two Bartons: B.S. Barton (1802-15) and W.P.C. Barton (1817-19). In 1854, of 362 members, 20 were naturalists, probably due to the active nature of the Academy of Natural Sciences. A general review of papers from 1774 to 1830 shows the names of the following physicians: J. Archer, 1774; B.S. Barton, 1794, 1800, 1803, 1811; John Brown, 1802; Benjamin Silliman, 1808; Wm. Darlington, 1808; Caspar Wistar, 1809; Wm. Baldwin, 1819; Gerald Troost, 1823; Richard Harlan, 1825, 1828, 1830; and John Godman, 1830.

THE PHYSICIAN-NATURALIST: THE ACADEMY OF NATURAL SCIENCES

With a medical school and a learned society, it was inevitable that a natural history museum would evolve in Philadelphia, and so it did. C.W. Peale, the portrait painter, a member of the American Philosophical Society, built a large room for his paintings. His friends donated local curiosities. "Dr. Morgan gave him some bones of a mammouth from Ohio; Professor Robt. Patterson, of the College of Philadelphia, presented him with a paddle fish from the Allegheny River; Dr. Franklin gave him an Angora cat from France, which was soon lost for want of proper means to preserve it; with these as a nucleus, it was suggested to Peale that he start a museum of natural history."[10] He moved to Philosophy Hall, which belonged to the American Philosophical Society, and the Society made him a curator and librarian. From 1802-27 Peale housed his museum in Independence Hall. In 1821, Peale's Museum took on the character of an education organization. Its staff included Dr. Gerald Troost in mineralogy, Thomas Say in zoology, Dr. Richard Harlan in comparative anatomy, and Dr. John Godman in physiology. Clearly, physicians were active in the museum, but these men devoted most of their time to the first truly natural history society in the city — the Academy of Natural Sciences of Philadelphia, founded March 17, 1812.[11]

It was in this society that Philadelphia had its greatest collection of physician-naturalists. These men were "amateurs," not full-time, who were primarily interested in taxonomy — the description of species. Forerunners of modern specialists, they became masters in particular fields of classification. Society in the early American republic had yet to be organized into the fixed patterns of subsequent years. The existing flexibility of social organization provided many opportunities for the educated individual to venture into new fields of exploration. Because medicine was still often the only scientific education available, it is not surprising that many physicians were also naturalists. The Academy of Natural Sciences of Philadelphia was formulated in the back room of John Speakman's Apothecary Shop. Of the founding members, two were physicians: Dr. Camillus M. Mann, and Dr. Gerald Troost, who held an M.D. from Leiden, never practiced medicine but managed a chemical and pharmaceutical laboratory in Philadelphia.[12] Members most active in the Academy were:

Thomas Say	John Cassin
C. A. LeSueur	William S. Vaux
Isaac Lea	George R. Glidden
Gerald Troost, M.D.	J. S. Phillips
Richard Harlan, M.D.	William Gambel
J. D. Godman, M.D.	T. M. Conrad
S. G. Morton, M.D.	S. S. Haldeman
Edward Hallowell	Thomas Meeham
Joseph Leidy, M.D.	Harrison Allen
Charles Pickering, M.D.	Joseph Carson
William Maclure	Robert Bridges

We will mention five in particular — Godman, Morton, Harlan, Say, and Pickering — as being representative of the group and at the same time revealing the close interaction of medicine and natural history.

Richard Harlan, M.D. (1796-1843), the son of Quakers, studied medicine with Joseph Parrish of Philadelphia and became a demonstrator in Parrish's private anatomical school after graduating from the University of Pennsylvania in 1818. He became a member of the Academy of Natural Sciences in 1815, a professor of Comparative Anatomy in Peale's Philadelphia Museum in 1821, and a member of the American Philosophical Society in 1822. Harlan was the first American to devote a major part of his time to vertebrate paleontology and his book *Fauna Americana* was the first systematic presentation of the zoology of North America. He collected specimens from his far-flung friends: Major Stephen Long, Thomas Nuttall, Titian R. Peale, and J.J. Audubon. Audubon promised Harlan "to do my best in the way of tortoises and also in the way of a Sea Cow!" From 1838-40, Harlan studied with Richard Owen at the Royal College of Surgeons in London.[13]

Fig. 4. Black Bear and Grizzly Bear. John D. Godman, *American Natural History,* Vol. I, opp. p. 131.

John D. Godman, like Harlan, practiced medicine but worked in natural history. His *American Natural History* (Philadelphia: H.C. Carey and I. Lea, 2 vols., 1826; 3 vols., 1826-28), illustrated with magnificent steel engravings, had a long-continued influence in the United States (Figure 4). Some of the drawings for the work were made by C.A. LeSueur, the Philadelphia naturalist-artist who later joined Robert Dole, Owen, Troost, Say, and Maclure on the great "boatload of knowledge" down the Ohio River to New Harmony, Indiana.[14] Godman's medical works are contained in *Addresses Delivered on Various Public Occasions, with an Appendix containing a Brief Explanation of the Injurious Effects of Tight Lacing, upon the Organs and Functions of Respiration, Circulation, Digestion, etc.,* published in Philadelphia in 1829.

Thomas Say (1787-1834) was not a physician. His father, Benjamin, and grandfather had been physician apothecaries, philanthropists, and founders of hospitals; his mother was the granddaughter of John Bartram. Young Thomas was sent to an apothecary with John Speakman. Speakman was interested in natural history, and it was in his apothecary shop that the Academy of Natural Sciences was formulated.[15] Say's *American Entomology* is one of the classics of American science, and its plates illustrate the magnificent artistry of the Philadelphia artists who did much work in natural history: C.A. LeSueur, W.W. Wood, and T.R. Peale. Books such as Say's could only have come about because the publishing industry in Philadelphia was flourishing and much more technically adept than that of Boston and New York.[16]

Samuel George Morton (1799-1851) received his M.D. from the University of Pennsylvania and, like Harlan, worked in Parrish's private anatomical school.[17] Harlan saw that Morton was elected to the Academy of Natural Sciences in 1820. Morton's description of fossil remains collected by Lewis and Clark, *Synopsis of the Organic Remains of the Cretaceous Group of the U.S.* (Philadelphia, 1834), marks him as a founder of invertebrate paleontology in the U.S., but he is best remembered for his work *Crania Americana* (Figure 5).

Fig. 5. Natchez, Front View. Morton's *Crania Americana,* Plate 21.

To show that Boston did have some influence in Philadelphia, we should include Charles Pickering (1805-78), who received his M.D. at Harvard in 1826 and promptly moved himself to Philadelphia, practiced some medicine, and became active in the Academy of Natural Sciences of Philadelphia of which he was already a corresponding member.[18] "For ten years he diligently used the excellent resources of the Academy to improve his knowledge, he was active on the zoological and botanical committees and held office of Librarian (1828-33) and Curator

(1833-37)." He became chief zoologist of the U.S. Exploring Expedition of 1838 (Wilkes) and in 1843 published his *Races of Men and Their Geographical Distribution* (1848). After participating in the Wilkes Expedition, he returned to Boston and to botanical pursuits, where he was considerably outshone by Asa Gray.

The physician-naturalists of the Academy were self-supporting physicians who developed a specific area of interest with the cooperation of other naturalists who likewise were amateurs, were self-sufficient, or in some cases, were of monied families (i.e., Isaac Lea, Thomas Say, Charles Pickering). Many had Quaker backgrounds (Say, Harlan, Morton, Baldwin). The areas of interest were not ancillary to medicine, as botany had been in the earlier period; it was science pursued for its own reward.

Another way to evaluate the efforts of the naturalists of Philadelphia is to review the career of John James Audubon. Audubon was often supported, both financially and with specimens, by the naturalists of Boston, Charleston, and New York. Philadelphia was no exception. When J. J. Audubon first came to Philadelphia in 1824, he was shepherded by Dr. James Mease, a favorite of Dr. Rush and an acquaintance of Lucy Blakewell's father, William. In Philadelphia, "The Icy City," he was befriended by Dr. Richard Harlan, who tried to persuade the Academy of Natural Sciences of Philadelphia to subscribe to *Birds of America* (they waited until 1831).[19] Audubon rewarded his loyal friend and agent of Philadelphia by naming a "new hawk" the Black Warrior or *Falco harlani.*[20] It was really a phase of the well known red-tail hawk. In the dedication Audubon wrote, "Long before I discovered this fine hawk, I was anxious to have an opportunity of honouring some new species of the feathered tribe with the name of my excellent friend *Dr. Richard Harlan,* of Philadelphia. This I might have done sooner, had I not waited until a specimen should occur, which in its size and importance should bear some proportion to my gratitude toward that learned and accomplished friend" (Figure 6).

Audubon was well received by Dr. Samuel George Morton, the Corresponding Secretary of the Academy, who had permitted him to portray the new birds that Nuttall and John Kirk Townsend had obtained in the West. Audubon was grateful to Morton, Townsend, and Say for their cooperation and again showed his appreciation by naming birds after his Philadelphia friends — Morton's Finch, Townsend's Solitaire and Warbler, and Say's Flycatcher.

Fig. 6. Harlan's Buzzard. J.J. Audubon, *The Birds of America,* Vol. I. plate 8.

MEDICINE AND NATURAL HISTORY: THE LEIDY ERA

In the third and last period of natural history in Philadelphia that we will discuss, the naturalists again moved back into the medical schools and universities. This is best exemplified by Jeffries Wyman, the comparative anatomist, Asa Gray, the botanist, and Louis Agassiz, all at Harvard; by Spencer F. Baird, the ornithologist, at Carlisle; by Benjamin Silliman and James Dwight Dana, geologists, at Yale; and by the great Joseph Leidy at the University of Pennsylvania Medical School in Philadelphia.

Joseph Leidy (1823-91) was the last of the great descriptive naturalist-physicians working in human anatomy, parasitology, protozoology, botany, and paleontology of mammals and reptiles.[21] After earning an M.D. from the University of Pennsylvania in 1844, he failed to build a medical practice. In 1848 he was elected to the Academy of Natural Sciences, which by then had become the foremost American institution for the deposit of paleontological specimens. In 1853, he became professor of anatomy at the University of Pennsylvania Medical School, a position he held for 38 years. A prodigious worker, he authored 597 books, papers and communications.

Leidy's most important works were: *A Flora and Fauna within Living Animals* (1851); *The Ancient Fauna of Nebraska, A Description of Extinct Mammalia and Chelonia from the Mauvaises Terres of Nebraska* (1854); *On the Extinct Sloth Tribe of North America* (1855); *Cretaceous Reptiles* (1865); and *Fresh Water Rhizopods of North America* (1879).

In natural history, Leidy worked with animals from the lowest rhizopod to the highest mammal. "He was a naturalist, and was one of the group....[that] took a similar view of nature. She was a whole made up of many parts played together, and they were interested in the whole drama....They were quite untouched by what we may call the 'laboratory spirit' which has arisen since their time — that spirit which isolates an object or phenomenon indoors in order to apply to it all the finest resources of modern scientific equipment."[22]

Leidy's medical contributions include demonstration of the existence of bacterial flora in the intestine, demonstration of *Trichina spiralis* in man, transplantation of human cancer tissue to frogs, description of amoeboid movement of leucocytes, and the first description of parasitic amoebae.

He wrote a textbook on anatomy in 1861, but it was to him an unessential episode in his life.

One of the fossils described in Leidy's book *On the Extinct Sloth Tribe of North America* (1855), the *Megalonyx Jeffersonii,* is Philadelphia's special fossil, as you will see.[23] Thomas Jefferson read a communication to the American Philosophical Society on March 10, 1797, entitled "A Memoir on the Discovery of Certain Bones of a Quadruped of the Clawed Kind, in the Western Parts of Virginia." Wrote Jefferson, "It is well known that the substratum of the country beyond the Blue Ridge, is a limestone, abounding with large caverns, the earthy floors of which are highly impregnated with nitre. In digging the floor of one of these caves belonging to Frederic Cromer, in the county of Green Briar, the laborers at the depth of two or three feet, came to some bones, the size and form of which bespoke an animal unknown to them."[24] Jefferson named this animal *Megalonyx,* or "great claw," and thought it was a huge lion, three times larger than the one figured by Buffon. Jefferson obtained these bones and presented them to the American Philosophical Society cabinet.

There the bones were studied by Dr. Caspar Wistar, who was graduated from Edinburgh in 1786, and was elected a fellow of the College of Physicians in 1787, the year the College was organized. Wistar was professor of anatomy and midwifery from 1808 to 1810, and professor of anatomy from 1810 to 1819 at the University of Pennsylvania. Wistar also wrote about the bones and suspected their affinity, not to lions, but to the modern sloth, and in some ways to an animal whose bones had been recently found in Paraguay and mounted in Madrid.[25]

Wistar's assumption was confirmed in 1804 by the great Cuvier, who designated the *Megatherium,* the largest of the ground sloths, an extinct group of edentate mammals related to the modern tree sloths. It is best known from skeletons obtained in Argentina which equaled the elephant in size. The *Megalonyx* form a closely related family. Professor George Simpson characterized Wistar's account "a model of cautious, accurate scientific description and inference, an achievement almost incredible in view of the paleontological naiveté of his associates and the lack of comparative materials."[26] Richard Harlan also described some bones from Big-bone Cave, Tennessee, and designated *Megalonyx Jeffersonii* as a species. The inestimable Leidy reviewed all the literature on the species in his monograph on sloths (1855), which showed a lithograph of the sloth bones (Figure 7). Thus, this fossil was truly a Philadelphia product — first described by Jefferson at the American Philosophical Society, diagnosed by Dr. Caspar Wistar, named by Harlan, and figured by Joseph Leidy.[27]

In his monograph on sloths[28] Leidy notes that a Mr. Darwin had collected some *Megalonyx Jeffersonii* bones in Argentina while on the voyage of *The Beagle.*[29] Those sloth bones were most important, in that ex-medical student Charles Darwin noted in his journal "the manner in which closely allied animals replace one another in proceeding southwards" in South America. These bones played a role in the formulation of the ideas promulgated in *The Origin of Species* (1859),

Fig. 7. *Megalonyx Jeffersonni* Harlan. Joseph Leidy, *On the Extinct Sloth Tribe of North America,* Plate I.

the book that would officially designate the end of the era of the descriptive naturalist and open the era of the evolutionary biologist.

The physicians involved with natural history in Philadelphia had played an important role in establishing the taxonomic basis on which the new Darwinian biology would rest. They had also paved the way for the acceptance of the new "laboratory sciences" — bacteriology, physiology, and chemistry. The crosscurrents between medicine and natural history ebbed as the tide of natural history receded and the forces were put into motion that would bring about the new wave of "scientific medicine."

NOTES

1. Ralph H. Major, *A History of Medicine* (Springfield: Charles C. Thomas, 1954), Vol. II, p. 730. Biographical material about Adam Kuhn is to be found in Howard A. Kelly, *Some American Medical Botanists* (Troy, N.Y.: Southworth Co., 1914), pp. 69-74; Joseph Ewan, ed., *A Short History of Botany in the United States* (New York: Hafner Publishing Co., 1969), pp. 4, 37; Carl and Jessica Bridenbaugh, *Rebels and Gentlemen, Philadelphia in the Age of Franklin* (New York: Oxford University Press, a Hesperides Book, 1962); Cecilia C. Mettler, *History of Medicine* (Philadelphia: Blakiston Co., 1947), p. 93; Jeanette E. Graustein, *Thomas Nuttall, Naturalist, Explorations in America 1808-1841* (Cambridge: Harvard University Press, 1967), p. 29; William Martin Smallwood and Mabel Sarah Coon Smallwood, *Natural History and the American Mind* (New York: AMS Press, 1957), p. 324.

2. Smallwood and Smallwood, *Natural History;* Ewan, *Short History of Botany;* Kelly, *Some American Botanists;* Joseph Ewan, "Benjamin Smith Barton," *Dictionary of Scientific Biography* (New York: Charles Scribner's Sons), Vol. I, pp. 484-486.

3. Graustein, *Thomas Nuttall,* pp. 24-25.

4. Benjamin Smith Barton, *Elements of Botany, or Outlines of the Natural History of Vegetables,* Illustrated by Thirty Plates (London: Printed for J. Johnson, St. Paul's Churchyard, by I. Gold, Shoe Lane, 1804), pp. viii-ix.

5. For biographical material about John and William Bartram, see Joseph Ewan, *William Bartram, Botanical and Zoological Drawings, 1756-1788* (The American Philosophical Society, 1968); Helen G. Cruickshank, ed., *John and William Bartram's America,* Selections from the writings of the Philadelphia Naturalists (New York: The Devin-Adair Co., 1957); Smallwood and Smallwood, *Natural History;* Ewan, *Short History of Botany;* Bridenbaugh and Bridenbaugh, *Rebels and Gentlemen;* Norman G. Brett-James, *The Life of Peter Collinson* (London: Edgar G. Dunstan & Co.); Whitfield J. Bell, Jr., "John Bartram,"*Dictionary of Scientific Biography,* Vol. I. 486-488, and "William Bartram," pp. 488-490.

6. For a reprint of John Bartram's introduction to Short's *Medicina Britannica,* see Cruickshank, *John and William Bartram's America,* pp. 50-51.

7. Joseph Ewan, "Frederick Pursh," *Dictionary of Scientific Biography,* Vol. II, pp. 217-219; Ewan, *Short History of Botany;* Smallwood and Smallwood, *Natural History;* Graustein, *Thomas Nuttall.*

8. Graustein, *Thomas Nuttall;* Phillip Drennon Thomas, "Thomas Nuttall," *Dictionary of Scientific Biography,* Vol. X, pp. 163-165.

9. For background on the natural history interests of the American Philosophical Society, see Max Meisel, *A Bibliography of American Natural History, The Pioneer Century, 1769-1865* (New York: Hafner Publishing Co., 1967), Vol. II, pp. 1-35; Brooke Hindle, "The Quaker Background and Science in Colonial Philadelphia," reprinted in *Early American Science, History of Science: Selections from Isis* (New York: Science History Publications, 1976), pp. 173-180.

10. Smallwood and Smallwood, *Natural History,* "Peale's Museum," pp 136-140, 165; Meisel, *Bibliography of American Natural History,* Vol. II, pp. 2-3; Whitfield J. Bell, Jr., *A Cabinet of Curiosities, Five Episodes in the Evolution of American Museums* (Charlottesville, Va.: University Press of Virginia, 1967).

11. For the history of the Academy of Natural Sciences of Philadelphia see Meisel, *Bibliography of American Natural History,* Vol. II, pp. 130-218; Smallwood and Smallwood, *Natural History,* "Philadelphia Societies," pp. 130-135; Morris Albert Linton, *The Academy of Natural Sciences of Philadelphia, 150 Years of Distinguished Service* (New York: Newcomen Society in North America, 1962); William S.W. Ruschenberger, *A Notice of the Origin, Progress and Present Conditions of the Academy of Natural Sciences of Philadelphia* (1860); Graustein, *Thomas Nuttall; From Seed to Flower, Philadelphia 1681-1876, a Horticultural Point of View* (Philadelphia: The Pennsylvania Horticultural Society, 1976), p. 81. For parallels in the development of natural history in Charleston, Boston, and Philadelphia, see George E. Gifford, Jr., "Charleston Physician-Naturalists," *Bull. Hist. Med.* 49(4):556-574, Winter, 1975.

12. Gerald Troost was president of the Academy of Natural Sciences of Philadelphia from 1812 to 1817. See Smallwood and Smallwood, *Natural History;* Ellen J. Moore, "Gerald Troost," *Dictionary of Scientific Biography,* Vol. XIII, pp. 466-467; George H. Daniels, *American Science in the Age of Jackson* (New York: Columbia University Press, 1968), pp. 225-226; William E. Wilson, *The Angel and the Serpent, the Story of New Harmony* (Bloomington, Ind.: Indiana University Press, 1964).

13. Whitfield J. Bell, Jr., "Richard Harlan," *Dictionary of Scientific Biography,* Vol. VI, pp. 119-121; Richard Harlan, *Fauna Americana: Being a Description of the Mammiferous Animals Inhabiting North America* (Philadelphia: Published by Anthony Finley, J. Harding, Printer, 1825); Samuel X Radbill, ed., *The Autobiographical Ana of Robley Dunglison, M.D.* (Philadelphia: The American Philosophical Society, 1963), Vol. 53 (Dec.) part 8; Howard Corning, *Letters of John James Audubon, 1826-1840* (Boston: Club of Odd Volumes, 1930), Vol. I, Vol. II; Howard Corning, *Journal of John James Audubon, 1840-1843* (Boston: Club of Odd Volumes, 1929), Vol. II, p. 25; Waldemar H. Fries, *The Double Elephant Folio: The Story of Audubon's Birds of America* (Chicago: The American Library Association, 1973); Francis Hobart Herrick, *Audubon the Naturalist* (New York: D. Appleton Co., 1917), Vol. I, Vol. II; Meisel, *Bibliography of American Natural History,* Vol. III, pp. 590-591.

14. Smallwood and Smallwood, *Natural History;* Wilson, *Angel and Serpent.*

15. Elizabeth Noble Shor, "Thomas Say," *Dictionary of Scientific Biography,* Vol. XII, pp. 132-134; Daniels, *American Science,* pp. 221-222; Harry B. Weiss and Grace M. Ziegler, *Thomas Say, Early American Naturalists* (Springfield: Charles C. Thomas, 1931); Wilson, *Angel and Serpent.*

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Memoir of Thomas M. Durant (1905-1977)

By GEORGE I. BLUMSTEIN, M.D.

> But nothing is more estimable than a physician who, having studied nature from his youth, knows the properties of the human body, the diseases which assail it, the remedies which will benefit it, exercies his art with caution, and pays equal attention to the rich and the poor.
>
> Voltaire - A Philosophic Dictionary--*Physicians*

Such an individual was Thomas M. Durant, M. D., Sc.D., M.A.C.P., thirty-eighth President of the College of Physicians of Philadelphia and one of the diminishing group of great bedside teachers, who died on June 21, 1977.

Born in Evanston, Illinois, on November 19, 1905, he displayed a wide range of interests with a strong sense of curiosity, oriented principally towards problem solving and initially directed to things mechanical. During his developmental period, a deep and abiding spiritual trend set in that was to become one of his guiding beacons throughout his life.

His interest in medicine first became apparent during his early years at college and, thereafter, grew in breadth and intensity. After receipt of a B.S. in 1928 from the University of Michigan and an M.D. from its Medical School in 1930, there followed an internship (1930-32) and a residency in medicine (1932-35) at his alma mater which laid a firm foundation for what followed. The intervening year before coming to Temple University as associate professor of Medicine in 1936 was spent at the Desert Sanatorium in Tucson, Arizona, as associate physician. Some of the inspirational teachers and medical greats of the period to whom he was exposed included Drs. Frank N. Wilson, John R. Paul and Charles L. Brown, all of whom helped mold his choice of a career towards academic medicine.

Tom's abilities as an outstanding clinician and bedside teacher received full recognition on the Temple teaching service at Old Blockley, formerly part of the now defunct Philadelphia General Hospital. Here, in the best Oslerian tradition, he taught hordes of interns, residents and staff members the complexities of medical practice from the foot of the patient's bed, stressing the need for a compassionate and sympathetic understanding of the patient's hopes, fears and anxieties.

Rewards in the form of promotions at Temple to full professor in 1947 and chairman of the Department of Medicine in 1956, as well as the Strittmatter Award of the Philadelphia County Medical Society (1956) and the Distinguished Teacher Award of the American College of Physicians (1972), acknowledge these versatilities. His teaching

experience also generated in him an abiding interest in Sir William Osler that eventually prompted him to help organize the American Osler Society (1970) and become its president in 1972-73.

As chairman of the Department of Medicine at Temple University School of Medicine (1956-66) he spent untold hours with medical students, helping them understand their reactions to people and particularly to sick and dying patients. This personal empathy was taken up by members of his staff, in whom it helped generate an esprit de corps that encompassed so many of the humanistic qualities that he felt were essential for physicians to possess. Regardless of position, titles, or honors, and there were many, Tom administered to the great and humble alike, giving unstintingly of himself. From 1966-71 he served as the first full-time Chairman of Medicine at the Albert Einstein Medical Center, a teaching affiliate of Temple University School of Medicine. After 1971, as Emeritus Professor, he continued his teaching chores by accepting regular assignments within the Department of Medicine at Temple. His greatest love in medicine, the role in which he excelled and for which he received the most recognition, was that of a teacher, an activity that he insisted on pursuing almost to the very end, despite his emeritus status and an advancing disease that made it almost impossible at times to ambulate without help. It was a heartening sight to see the multitude of students and house officers that were attracted to Tom's rounds whenever he returned to teaching assignments. Patients adored Tom because of his deep personal interest in them, his unhurried yet thorough manner, his ability to explain complicated medical problems in simple terms, his warm and reassuring attitude that emanated confidence, and because he was a gentleman in every sense of the word. When patients were asked to qualify this phrase the invariable reply was, besides giving a painstakingly complete examination and a satisfactory explanation of their condition, he would help them on with their coats and keep the door ajar for their departure—truly "a gentleman in every sense of the word" by any and every definition.

The crowning achievement in his long and distinguished career, in the opinion of this memorialist, was teaching physical diagnosis to Temple's first blind medical student, David Hartman. NBC produced and telecast nationally a documentary film on the modalities used to educate a blind student, but, to those of us who witnessed it, Tom Durant's teaching a blind student the art of seeing through other senses was even a greater accomplishment than the film could show. To the very end Tom remained the modest, humanistic, scholarly, dedicated physician-teacher he set out to be.

Numerous organizations recognized his abilities and honored him by appointment to positions of prominence. Dr. Durant served as president of the American Federation for Clinical Research in 1945-46; as a member of the Editorial Board of the *American Heart Journal* from 1950-67; as an Associate Editor of the *American Journal of the Medical Sciences* from 1951-68; Chairman of the American Board of Internal Medicine, 1957-59; President of the College of Physicians of Philadelphia, 1961-64; President of the American College of Physicians, 1964-1965; National Consultant to the Surgeon General, U.S.A.F., 1966-68; founding Head of the Greater Philadelphia Committee for the Medical Pharmaceutical Sciences and its first President from 1963-68; Chairman of the Drug Research Board of the National Research Council, 1968-70; member of the Editorial Board of *Medical Insight,* 1969-71; member of the National Formulary, 1969-71; chairman of the task force on Psychiatric Education for the Internist and Generalist of

the American Psychiatric Association, 1965-70; and Master, American College of Physicians, 1969. He received the Distinguished Almunus Award from his alma mater, the University of Michigan, in 1970, and an honorary doctorate in science from Franklin and Marshall College, Lancaster, Pennsylvania, in 1964, and was a member of Sigma Xi and Alpha Omega Alpha honor societies.

Many of his bedside observations and clinical research findings were recorded in some 93 publications in the medical literature, dealing primarily with cardiovascular problems like hypertension, coronary thrombosis, pulmonary embolism, pericarditis, cardiac decompensation and the use of carbon dioxide as a contrast medium for cardiovascular diagnosis. Later in his career, he also embraced things historical, his last publication being "My Debt to Osler," which appeared in our own *Transactions and Studies* in October 1973.

Tom played and prayed as hard as he worked and enjoyed their benefits or rewards equally. Tom practiced what he preached; he was devout in his religion and served as an elder of his local Presbyterian Church. He was an amateur philatelist, a musician (saxophone), an ardent golfer and member of the Merion Golf Club, and an enthusiastic follower of his favorite sport, baseball.

Beyond all these honors and accolades, Tom took greatest interest in and received untold joy and pride from his family and their accomplishments. Tom married Jean Margaret de Vries on June 25, 1929, who survives him. Also surviving are his three children, Dr. John R. Durant, Mrs. Carolyn D. Christian, and Mrs. Catherine E. Voorhees, and ten grandchildren. The Durants' lakeside abode at Holland, Michigan, was the family recreation retreat where they gathered and enjoyed their vacations together.

The strength of the family ties was best exemplified when it was needed most, during Tom's long and increasingly disabling final illness. At home or at his Michigan "shack," as he referred to it, he was under the constant vigilance of his devoted wife, Jean, who gave him his head and permitted him to follow his daily routine until or unless it was inimicable to his physical well being. This helped buoy his spirits and permitted him to enjoy the social, cultural, organizational, and scientific activities that had been such an important and integral part of his life. His cheerfulness was nowhere more evident than when referring to his children and grandchildren and the various things that they did to make him proud of his offspring.

Those of us who were fortunate enough to have been associated with this humanistic, scholarly and dedicated physician as a patient, colleague or friend join with his family in remembering his accomplishments and inspirations.

Memoir of J. Francis Mahoney (1914-1976)

By RODERICK L. TONDREAU, M.D.

Dr. J. Francis Mahoney, director of the Department of Radiology of the Mercy Catholic Medical Center of Southeastern Pennsylvania, died suddenly on November 12, 1976. He lived at 324 Ingeborg Road, Wynnewood, Pa.

He was born in Philadelphia, graduated from Northeast Catholic High School in 1932, then entered the University of Pennsylvania where he was elected to Phi Beta Kappa. He was a member of the Varsity Crew, the Varsity Boat Club and the Newman Club.

Fran Mahoney entered the University of Pennsylvania School of Medicine at the end of his junior year as an undergraduate and was granted the A.B. degree with the Class of 1936. He continued to achieve academic excellence in medical school and, named to the Dean's List, was selected for the coveted two-year rotating internship in the Hospital of the University of Pennsylvania upon receiving the M.D. degree in 1939. During his senior year in the School of Medicine, he was class chairman of the Bicentennial Committee for the observance of the two hundredth anniversary of the founding of the University of Pennsylvania (1740-1940).

From 1941 to 1944, Dr. Mahoney was a fellow in radiology, under Dr. Eugene P. Pendergrass, in the University Hospital. He was certified by the American Board of Radiology in 1944, then remained as an associate member of the department until 1946 when he joined Dr. Bernard P. Widmann. He had faculty appointments in the University of Pennsylvania as instructor in radiology in the School of Medicine from 1944 to 1947 and associate in the Graduate School of Medicine from 1944 to 1960.

The association with Dr. Widmann was a long, successful and cordial one which lasted until the latter's death in 1972. It continued a fine tradition in Philadelphia radiologic practice, in their private office at 250 South Eighteenth Street and at the Fitzgerald Mercy Hospital, Darby, now a division of the Mercy Catholic Medical Center. Dr. Widmann had been associated with the pioneer radiologist, Dr. George E. Pfahler, in the private practice of radiology for ten years and had succeeded the latter as Vice-Dean for Radiology in the Graduate School. Dr. Widmann and Dr. Mahoney combined office and hospital practice for many years, spending mornings in the office and afternoons at the hospitals, Dr. Widmann primarily at the Philadelphia General Hospital, where he was director of radiology, and Dr. Mahoney at the Fitzgerald Mercy Hospital. Fran became full-time director of the Department of Diagnostic Radiology of the Mercy Catholic Medical Center in 1972, a position he held at the time of his death.

Dr. Mahoney, who was the author of a number of scientific publications, was a popular and respected teacher of the many residents who trained at the Mercy Medical Center and in the Graduate School of Medicine of the University of Pennsylvania.

He served as president of the Philadelphia Roentgen Ray Society in 1961-62 and was a member of the Pennsylvania Radiological Society, the Radiological Society of North America, and the American Roentgen Ray Society, and a Fellow of the American

College of Radiology. He was a Fellow of the College of Physicians of Philadelphia and held memberships in the Philadelphia County Medical Society, Pennsylvania Medical Society and American Medical Association. He had been a member of the Board of Directors of the Delaware County Tuberculosis and Health Association since 1952 and for thirteen years served as a member of the Board of Directors of the Delaware County Section of the American Cancer Society.

One organization with which he had close ties was the Association of Pendergrass Fellows, composed of men who had trained with or had been associated with Dr. Eugene P. Pendergrass, the long-time chairman of the Department of Radiology of the University of Pennsylvania School of Medicine. Members of the group meet formally and informally several times a year at meetings in the United States or abroad, and often gather in members' homes. No function was ever complete without the presence of Fran and Peg Mahoney, and I daresay no group will miss him more sorely. He was a good friend.

In addition to his medical accomplishments, Fran Mahoney was an expert bridge player, an ardent golfer and trapshooter, with memberships in the Aronimink Golf Club, the Seaview Country Club and the Atlantic Indians Trapshooting Club. He was a member of the Union League of Philadelphia.

On December 30, 1944, Francis Mahoney married Dr. Margaret Jane Gerlach, a dermatologist who has engaged in the private practice of her specialty in Wynnewood for many years. Peg and Fran Mahoney were blessed with a wonderful family of four sons — J. Francis, Jr.; Dr. James W., an anesthesiologist at the University of Oregon; Harry G., Esq.; and Peter T. — a daughter, Jane, Esq., and one grandchild. Two sisters survive: Mrs. Charles Shannon of Rosemont and Mrs. Carl Seelaus of Rye, New York.

A Mass of Christian Burial was offered at Our Lady of Lourdes Church, 63rd Street and Lancaster Avenue, Philadelphia, on November 15, 1976.

Memoir of Joseph B. Sarner (1915-1975)

By CHARLES FINEBERG, M.D.

Joseph Barr Sarner was born in Philadelphia on August 28, 1915, to Fannie and Harry Sarner. Educated in the public schools of that city, he received both his B.A. degree in 1937 and his M.D. in 1941 from the University of Pennsylvania. Dr. Sarner entered military service with the United States Navy during World War II, serving on active duty from July 1942 through June 1946. He was awarded seven bronze combat stars and was discharged in 1946 with the rank of Commander.

Dr. Sarner was certified by the American Board of Colon and Rectal Surgery in 1952. He served on the staffs of the Graduate School of Medicine of the University of Pennsylvania, the Daroff Division of the Albert Einstein Medical Center, and the Pennsylvania Hospital. In these teaching institutions, Dr. Sarner engaged enthusiastically and effectively in the instruction of graduate students and students in proctology from the University of Pennsylvania and from the Thomas Jefferson University School of Medicine. He attained the position of associate in proctology at the Graduate Hospital and was associate surgeon to the Pennsylvania Hospital. He was senior attending surgeon and chief of proctology at the Albert Einstein Medical Center from 1946 until his death.

A Fellow of the College of Physicians of Philadelphia, Dr. Sarner was also a member of the Pennsylvania Society of Rectal and Colon Surgeons, of which he was President during the years 1969 and 1970. Dr. Sarner was a member of the Advisory Committee on Proctology for Pennsylvania Blue Shield. At various times, he was a member of the Tissue and Audit Committees at all three hospitals of which he was a staff member. A meticulous and conscientious practitioner, Joseph Sarner was a long-time pioneer and leader in the field of review of performance and activity both of his colleagues and of house staffs; he was always available for committee assignments and was skillful in the arbitration of problems arising in the institutions in which he served.

Dr. Sarner was the author of numerous publications in the field of rectal and lower colon surgery, one of which described an original technique for plastic relief of anal stenosis.

In August 1974, Dr. Sarner was recipient of the Orville C. King Surgical Award presented by the staff of the Pennsylvania Hospital. This recognition, of which Joe Sarner was justifiably proud, was awarded "to the physician who has made a significant contribution to the education of surgical residents... in honor of an outstanding surgeon, teacher and gentleman." That statement epitomizes the character of the recipient. Dr. Sarner's house staff and students found him to be a skillful, totally honest, and highly motivated individual with strong convictions in all aspects of his professional and personal conduct. Although outspoken in support of his opinions, Dr. Sarner was truly a gentle man. He never hid behind the cloak of hypocrisy; though his principles and convictions were rigid, his decisions were couched in words carefully chosen and expressed. His rabbi aptly described him as "affable, thoughtful, warm-hearted, with the law of truth in his mouth."

Dr. Sarner loved photography and had a discerning ear for classical music. Among his hobbies was the recording of music, and his tape library was a monument to his love of beautiful things. An avid reader, he had a special interest in the history of the Civil War. But Joe Sarner also demonstrated a deep interest in life and the people around him. This was exemplified in his dedication to his patients. Not only was he interested and concerned with their physical complaints, but he seemed always able to deal with their personal problems with a special compassion and wisdom. The most vivid proof of his unique character and personality was the universal respect accorded him by his associates, his colleagues, and his patients.

His devoted wife of nearly 34 years was a true companion and partner in every aspect of their life together. She not only assisted him most ably in his office, but participated with him in his devotion to their synagogue, historic Congregation Mikveh Israel. They served together on its Board and their partnership has reached fruition in the recreation of that institution on Independence Mall and in the establishment of the Museum of American Jewish History. Mrs. Sarner works actively today to assure the realization of their mutual dream.

Joseph Barr Sarner died October 1, 1975. He is survived by his wife, the former Ruth Braude, his son, Joel, and his daughter and son-in-law, Joyce and Lyndon J. Parker. A grandson was born on May 25, 1976, and was named Joseph Aaron Parker. Dr. Sarner is also survived by a sister, Sylvia Barmach, and two nieces, Roberta Lodge and Gladys Pincus.

Joseph Sarner will be remembered as a very rare individual, a gentle human being and a distinguished member of the medical profession. He will be sadly missed by all who knew him.

The editors regret the delay in the publication of this Memoir.

Annual Report on the Library

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THE COLLEGE LIBRARY — 1976-77

Major concerns of the Library Committee and the Library administration during the year were stack space, journal use, regional function, and financial management.

Stack space: When an addition was planned to the Library stack in 1954 it was expected to provide for twenty years' growth. When the new stacks were ready for occupancy in 1956 it was apparent that the reduction in old stack space caused by the addition of duct work, an elevator shaft and a vertical air plenum, together with two more years of acquisitions and the architects' predilection for wider side aisles than necessary, would require an adjustment of this projection.

When the new stack was completed journal volumes from 1800 to 1939 were transferred to the new area, but the space gained looked inadequate for twenty years' growth. In 1965, as space began to melt, considerable numbers of files of state and city health reports from geographically remote agencies were offered to more appropriate libraries. The Library Committee reviewed alternative plans for expansion in 1966 and 1967. Covetous eyes were cast in the direction of the now razed Erlanger Garage in 1968.

In 1969 and 1970 bound volumes of duplicate journals and miscellaneous unsorted gifts were sold or discarded. Resource grant funds provided in 1971 permitted starting a major transfer operation. Failure to secure renewal of the grant brought this relocation to a halt in 1972.

In 1975 increasing pressure led to a review of plans and recalculation of space which could be made available by shifting. A six-phase plan was generated but lack of personnel stymied progress. Overflows that had been relegated to out-of-sequence locations required reintegration.

In 1976 serious discussions and studies considered alternatives of remote storage, new construction, and microfilming. In December 1976, President John P. Hubbard, M.D., appointed a sub-committee of the Library Committee chaired by Palmer H. Futcher, M.D., to restudy the space problem in the light of new and anticipated programs of the College.

Dr. Futcher drew upon library staff judgement to identify library user groups and segments of the collections to ascertain the relative importance of the discrete parts. This exercise confirmed the suspicion that the remote storage of any significant portion of the collection would cause major service problems, with the possible exception of sections of dissertations.

A restudy of the composition of the collection revealed the following allocation of stack space to the identified categories of material.

Category	*Date*	*Stack sections*	*Percentage of total stack space occupied*
Books	1800-date	810	27.3
Serials	1800-1899	231	7.8
Serials	1900-date*	791	26.7
Serials	1940-date*	731	24.6
Historical Collection	Pre-1800	368	12.4
Pamphlets	1800-date	12	.004
		2,943	98.804

*Overlapping dates in different areas of old and new stacks

The medical dissertations occupied 118 sections or four percent of the total collection and were shelved with the historical collections. A section is defined as one set normally providing six or seven, three-foot shelves.

The total number of sections in the stack building is 2,968. It is obvious that less-used portions of the collection must be stored more compactly to provide growth space in sections to be occupied by the most recent, most actively used segments of the collection. Hopefully 1940 to 1950, 1955, or 1959 journal volumes can be transferred to more compactly stored portions of the collection.

Dr. Palmer Futcher's study (a twelve-page report) completed in April 1977 states that all book space will be fully occupied in ten years and that stack management will be extremely difficult in five years. Action for the provision of stack space must be initiated by 1978 if new space is to be constructed (allowing four years for architectural planning, construction - and fund raising). The same timetable is required if remote storage is the chosen alternative, to permit exploration and development of interinstitutional cooperative endeavors. The information in the Futcher report is intended to assist the College Planning and Development Committee in the establishment of institutional priorities.

The space problem is not simply a College concern. By virtue of the regional function performed it should be a matter of interest to all the institutions which look to the College Library as a shared facility housing great amounts of medical information not otherwise available in the region. This need is not significantly met by the development of microform techniques, cooperative cataloging arrangements, or membership in research library consortia, since most of the benefits of such arrangements have already been achieved by tacit cooperative acquisition policies in the region.

The College Library's service constituency includes the 1600 Fellows, almost 200

institutional registrants, the Medical Documentation Service's more than thirty current awareness clients, the College PREP (Practice-Related Educational Program), the Mid-Eastern Regional Medical Library Service to cooperating libraries, the activities of the Division of the History of Medicine, and walk-in users of the collection.

The Futcher report identifies the following alternatives: 1) Sale or surrender by other means of a large proportion of library holdings; 2) transfer of older materials to remote storage following the example of the Medical Library Center of New York; 3) construction of new stacks. These alternatives would be modified if the College elected to curtail its present acquisition rate materially.

The report concludes by identifying information which is needed to choose among alternatives. First, it would be helpful to know more about the plans and anticipated needs of the institutions which look to the College as a back-up library resource. Secondly, the report calls for more precise information about the library materials needed by each category of users.

An informal staff guesstimate of what user groups utilize what types of material resulted in the following tabulation, in which 3 indicates major use, 2 occasional use and 1 seldom used.

With this kind of information Dr. Futcher expects the College to decide which function it will fulfill during the period 1980-2000, what requirements the conduct of these roles will set for its library, what funds will be avialable for new stack construction or remote stack facilities, what funds will be available for day-to-day maintenance of the library during the period 1980-2000, and the size of the library which it will maintain during that period.

The most encouraging action taken was the authorization to employ a stack assistant for one year to devote full time to shifting the collection, to store the less used materials more compactly, and to use what space is available in the areas of growth. This staff position was filled on July 1, 1977.

Journal use: The expenditure of about $100,000 for journal subscriptions justifies the closest scrutiny of this budget category by the Library Committee and the Library Administration. Journal renewals are reviewed each year on a title-by-title basis with a zero-base budget attitude. The traditional criteria of journal selection used are: coverage by published indexes and abstracting tools; reputation of sponsoring agencies, publishers, and editorial boards; length of back files; language; cost of the journals themselves; and existing subject

	Current serials		*Older serials*		*Pre-1800*	*Theses*
	Engl.	*Non-Engl.*	*1900-59*	*Pre-1900*	*materials*	
Fellows	3	3	2	2	2	1
Institutional registrants	3	3	2	2	1	1
M.D.S.	3	3	1	2	1	1
Div. of History of Medicine	2	2	3	3	3	2
PREP	3	1	1	1	1	1
MERMLS	3	3	2	2	1	1
MEDLINE users	3	3	2	1	1	1

strengths of the collections which result from restricted gifts and S. Weir Mitchell endowments. In addition, decisions to subscribe are influenced by records which are made of requests which are not filled.

Beginning with June 1976 records have been accumulated of all journal uses in the following categories: journals used in the reading room, titles from which photocopies are made for library clients, journals made available in original in lieu of copying as part of the Regional Medical Library program, and titles used by the Medical Documentation Service to provide information to clients.

The first two month's usage analyzed tabulated 13,391 uses from 2,398 different journal titles. Distribution of use among the titles used 10 or more times follows.

top 15 titles	6 percent
top 100 titles	23.2 "
top 200 titles	36.2 "
top 300 titles	46.2 "
top 400 titles	54.4 "
top 420 titles	55. "

The most significant aspect of this study is the fact that the 67 most used titles supplied only 17.8 percent of the total use, whereas earlier studies at Columbia and Yale showed 50 percent of their use was met by the same number of titles. This differential is attributed to the effect of the regional function performed by the College as recipient of requests which were not filled previously in other libraries, together with the selective dissemination of information function of the Medical Documentation Service.

These use records are reviewed whenever a journal title is renewed. The Library Committee agreed that another selection criterion for renewal of journal titles could be sufficient use to result in income which would recover the subscription cost in twenty years. At the present time it is estimated that $3.25 is recovered by each circulation.

The value of a strong journal collection to the College is the income derived from institutional and individual registration fees paid to obtain access to a library capable of meeting about eighty percent of their journal needs. The library also recaptures part of its costs from the photoduplication service which is offered. The value of the selective dissemination of information (S.D.I.) service provided by the Medical Documentation Service also depends on the strength of the Library collection. Another consideration is the policy of many hospital libraries and smaller institutions to discard journal ten years old or older because of space limitations, in the expectation that large libraries like the College will be able to supply them. Journal selection and retention policy has become a fine art requiring the balancing of multiple factors defying simple solutions. It is most recently complicated by the unforeseeable results of the new copyright law.

Registration fees: During the year the Committee considered the registration fees paid by institutional users. A fixed minimum fee is established for corporate borrowers. This fee entitles each such borrower to loans of original material at the rate of $3.25 per loan up to the amount of their registration. An introductory rate of $75.00 is offered the first year for new subscribers. This enables the registrant to borrow 23 items and to order unlimited photocopies at the established rate for photoduplication. When 23 items are borrowed before the end of the year the registration must be renewed, thereby introducing a relationship between the fee and the amount of use made by the corporate borrowers.

Contributors courtesy stamps are issued to registrants for use with each loan request. These stamps expire at the end of each fiscal year. During the previous year registrations amounted to $43,595. Some 4,227 borrowing

stamps were redeemed so the actual income per loan completed was about $10.00. Registration income sources were $28,050 from corporate borrowers, $14,125 from nonprofit institutions and $1,420 from individuals.

Nonprofit institutions which exceed their quota of federally funded loans or photoduplication offered in lieu of the original may register at a first-year rate of $25.00 and a subsequent minimum of $50.00. Many area nonprofit institutions pay considerable amounts above minimum requirements to demonstrate their willingness to share the costs of the collection and services which the College of Physicians shares with the community. This cooperative enlightened support of the College Library provides a much stronger source of medical information than could be provided by any one institution. As the costs of medical journals and other library budget components escalate the logic of this symbiotic relationship becomes increasingly compelling.

Mounting library costs have been exacerbated by more stringent funding of the Regional Medical Library program. Reductions in the number of funded document delivery transactions and the elimination of such programs as regional information service have had a major impact on the budgets of the College and other component parts of the biomedical communication network.

Almost from the beginning, federal support has been directed to the reimbursement of the costs of loans and has not been available for the purchase, processing, housing or provision of on-site access to library materials. Library registration fees do help in these areas but do not cover the journal subscription costs of about $100,000 per year.

College Library Information Service (CLIS): Before the end of the year the College confirmed its intention to continue the service previously funded by the National Library of Medicine as part of the Regional Medical Library Service contract. Many libraries which had enjoyed the benefits of the Regional Reference Service since its inception with the original grant program in 1969 indicated their willingness to share the costs of this successful program.

Policy and objectives: At its October 1976 meeting the Library Committee endorsed Dr. Radbill's expression of conviction that the unity of the Library's collections, including the historical materials should be preserved under the administrative supervision of the Librarian. Discussion in December produced agreement that institutional library registrations obviated the necessity of provision in the College by-Laws for institutional memberships. In February 1977 the Librarian offered the following statement to the Library Committee in response to a request for a definition of the Library's goals: the Library's goal is "to improve medical education, to advance medical research, and to promote better patient care by providing access to medical information through the provision of medical library materials and services."

LIBRARY'S HISTORICAL COLLECTIONS

Following a year dominated by preparations for the Bicentennial celebration, the staff of the Historical Collections returned to more usual activities in 1976/77. The number of researchers using the Collection's resources continued the steady upward trend of recent years. Sixty-five Fellows of the College sought assistance from the Curator on nearly 200 occasions. Researchers from 29 states and 8 foreign countries - including Sweden, France, and South Africa - made inquiries by letter, telephone, or personal visit. As usual the researchers were a varied

group with interests just as diverse: a Jesuit priest came from Detroit to see a fifteenth century book; a Cuban pharmacist needed a portrait of Carlos Finlay for an official presentation to the Mayor of Philadelphia; a secretary was curious about the origin of the term "charley horse." Frequent inquiries came from university students, physicians, genealogists, commercial publishers, and bibliophiles. The Curator also answered questions from local medical librarians about the evaluation or preservation of old books. Eight hundred ninety-three books and manuscripts were paged for readers from the locked areas of the stacks; the pictorial collections were also heavily used. Through the cooperation of staff members the Historical Society of Pennsylvania, it became possible for the first time in several years to produce microfilm copies of research materials for our users.

The Bicentennial exhibit remained on display in the College foyer until April 1977, almost exactly a year after it was opened, and continued to attract the interest of visitors. The modular display cases have since been moved into the Mütter Museum where they will again be on view after some modifications in content. Only two exhibits were prepared during the year. For the meeting of the Pennsylvania Academy of Dermatology in September 1976, the Curator arranged cases of bibliographic "Treasures of Dermatology 1572-1880" and books and prints illustrating the life and work of Louis H. Duhring as well as "Dermatology in Philadelphia." Two very special items were displayed in December 1976: the original manuscript constitution and delegates book from the founding meetings of the American Medical Association in 1846 were shown during the AMA Clinical Meetings in Philadelphia. Several books were lent by the College to a Bicentennial exhibition on "Europe in 1776" at the Grolier Club in New York City, and several others to the Biddle Law Library of the University of Pennsylvania to illustrate "Law and Medicine in the 19th Century."

Cataloging activity remained fairly steady overall, largely because of the continued generosity of the Women's Committee in providing funds for a part-time cataloger. Glenys A. Waldman, Ph.D., came several days a week for ten months while completing library science studies at Drexel University. She worked mainly on the backlog of 18th and 19th century pamphlets.

Dr. Waldman's work was also partly funded by a gift to the Library of one thousand dollars from the Herman and Ruth Goodman Foundation. This money, earmarked for expenditures related to dermatology, enabled the cataloging and sorting of a large portion of the dermatology books, papers, slides, and pictures which have come to the College in recent years through the efforts of Dr. Lawrence Parish and the American Academy of Dermatology.

New-book cataloging was handled by the Curator and increasingly by staff member Patricia Connors. The year's cataloging statistics follow:

Items newly catalogued:	320
Items recatalogued:	132
Articles analyzed:	27
Manuscripts catalogued:	12
Cards filed:	5,895

The Acting Curator participated in several special events during the year, including a talk before the Jovians, a subgroup of the History of Science Society, on electrotherapy collections in the College library (December 1976), and a workshop presentation of "Landmark Books of Ophthalmology" before a session at the Wills Eye Conference (February 1977). Mrs. Karen Reeds' graduate students studying Science and Printing in the Renaissance came to the Library from Bryn

Mawr College in April for a lecture-exhibition. Professional contacts were maintained through a visit by the Acting Curator to the Institute of the History of Medicine at Johns Hopkins University and attendance in May at the annual meetings of the American Association for the History of Medicine and the Association of Librarians in the History of the Health Sciences, in Madison, Wisconsin.

Mrs. Lisabeth Holloway left her position as Curator of the Library's Historical Collections at the end of July 1976. Her twelve years of exceptionally devoted and scholarly service are reflected particularly in her skillful cataloging of many of the Library's historical manuscripts and her imaginative creation of extremely useful reference tools for research in medical history. Ellen G. Gartrell was named Acting Curator and on June 1, 1977, was appointed Curator of the department. The decrease in staff size upon Mrs. Holloway's departure made even more vital the continuing capable service of departmental assistants Jean P. Carr and Patricia A. Connors. Both assumed additional responsibilities with good cheer and offered much-valued support to the new Curator.

A number of individuals and organizations made gifts to the Historical Collections during 1976/77. Among the particularly noteworthy contributions are the following:

Illustrated manuscript of surgical operations, after H.E. Fritze, 1848. Gift of Oscar V. Batson, M.D.

Letters, certificates, and memorabilia of Wilson Jewell, a 19th century Fellow of the College. Gift of Mr. and Mrs. Robert K. Powell.

Medical school lecture notes (1822/23) and manuscript prescription book of Dr. Francis Julius LeMoyne, given by his great-grandson, V.L. Ellicott, M.D.

Professional papers and collected reprints of T. Grier Miller, M.D. Presented by the author, a former President of the College.

Two 19th century physicians' record books and a scrapbook on Charles Guiteau (assassin of President James Garfield), as well as a number of published books were given by Charles E. Rosenberg.

Regular and very welcome gifts continued to come to the Historical Collections from Drs. Fred B. Rogers, Samuel X Radbill, and Lawrence C. Parish, and from Mr. Richard W. Foster. Our appreciation is also extended to the following donors: Dr. Katharine Sturgis, Dr. Steven J. Peitzman, Texas Medical Center, Inc., Scholarly Resources, Inc., Russell B. Frost, Judith Neaman, Sergio Amaro Mendez, Temple University Health Sciences Center, Torrance State Hospital, Logan B. Gill, Louis Poliniak, Dr. George Spaeth, H.E. Kennedy, Joseph C. Carter, Mrs. Philip D. McMaster, Mrs. William Hacker, W.B. Saunders Co., Patricia A. Connors, Dr. Herman Beerman, Dr. John P. Hubbard, St. Elizabeths Hospital, Arno Press, Inc., Dr. G. Davis Gammon, Dr. Russell S. Boles, American College of Physicians, Dr. Joseph T. Freeman, Dr. Mary Hunsicker-Tonti, Dr. Kenneth E. Appel, Dr. Emily H. Mudd, Dr. Craig W. Muckle, Dr. Arthur M. Dannenberg, Sr., Gertrude Traubel, Dr. J. Walter Wilson, Northwestern University, AMS Press, Warren Weiss, Dr. Oliver P. Jones, Lisabeth M. Holloway, Dr. Alma Dea Morani, David L. Cowen, Mrs. J.B. Rudolphy, Mrs. E. Paul duPont, Morris Vogel, and the American Philosophical Society Library.

Ellen G. Gartrell,
Curator

REPORT OF THE ASSISTANT TO THE LIBRARIAN AND FELLOWS' LIBRARIAN

The S. Weir Mitchell Associates increased by two endowments this year. The slow growth of this splendid program is cause for regret, and the Fellows' Librarian invites inquiries, and will gladly explain the program to Fellows who may wish to give visible support to their Library.

Visitors to the Library included Dr. W. Hoogstraten and Mr. A.G. Pollgeest of the Netherlands, representing Ciba-Geigy and the Dutch Pharmaceutical Association. Classes from Temple University, Dobbins Vocational School, Drexel University Graduate School of Library Science, and Villanova's Graduate School of Library Science met at the Library for tours and a lecture on the Library's services and collections.

Fellows' use of the special services of the Fellows' Librarian showed a gratifying increase both in number of Fellows availing themselves of the service and the number of requests. The following statistics do not record Fellows' use of the reading rooms or the direct circulation of books to them, but only the special requests directed to the Fellows' Librarian, mostly by letter or telephone.

In addition to the Fellows' Librarian's services, the Library Photoduplication department provided 1247 copies of articles to 216 Fellows at an estimated minimum value of $3,741. Each Fellow is entitled to ten articles photocopied free each year and to a discount of 20 percent for subsequent articles.

The Photoduplication department filled 18,167 requests for a total of 150,153 pages. Included in these figures are the photocopies provided to subscribers to the Medical Knowledge Self-Assessment Program IV of the American College of Physicians. These figures are in addition to the work of the Regional Photocopy Service.

Fellows' Services
July 1, 1976 - June 30, 1977

No. of Fellows served		278
once only	159	
2-5 times	88	
6-10 times	20	
over 10 times	11	
Types of Service		
Reference questions		95
Bibliographic searches		201
Citation verification (a single request may comprise multiple items)		80
Loans via mail or delivery service		41
Advance paging of materials for later use in library		6
Books especially ordered for Fellows		4
Miscellaneous (questions about gifts, events, location, privileges, etc.)		7

The duplicate journal collection was discontinued during the year in order to provide space in the basement area for the expanded activities of the Medical Documentation Service.

The Library paging staff, in addition to its primary duty of paging and shelving, pam-bound 770 volumes. Each year this report offers an opportunity to recognize the outstanding service the pages render to the users of the Library. With unfailing amiability and courtesy, the pages perform a first-rate public relations service, since they are often the first, and sometimes the only, contact patrons have with staff.

The Fellows' Librarian attended a workshop on management techniques at Lancaster County Public Library, two meeting of the local College and Research Libraries Association, a meeting at Ursinus College on the new copyright law, and the meeting of the local Medical Library Association regional group. She lectured twice to Drexel Library School classes.

During the year the Library supervised a four-month "practicum" for Miss Deborah

Hall, student in the Villanova Graduate School of Library Science, who worked one day a week during Spring term, on rotation through the various departments of the library.

A number of staff members were enabled to join a Drexel class on a study tour to the National Library of Medicine in the spring, an experience they found at once interesting and beneficial.

The Fellows' Librarian feels satisfaction in the ten percent increase in the number of Fellows turning to the Library, and hopes in the coming years the service will be used increasingly by the Fellowship. Some sixteen percent of the total Fellowship now asks for special service in addition to their reading room and photocopy use. My sincere wish is to be able to facilitate Library access and service to each and every Fellow of the College.

Beatrice F. Davis
Assistant to the Librarian
and Fellows' Librarian

SERIALS DEPARTMENT

During the 1976-77 fiscal year, the Serials Department continued to take measures initiated previously against spiralling journal costs, and to improve service to our users.

Virtually every subscription was reviewed before being renewed, and thirty-seven little-used journals were cancelled after the 1976 volumes. The following criteria were applied: 1) coverage by abstracts and indexes; 2) availability of other copies in the area; 3) relation of the journal to traditional library strengths and special interest groups among the Fellows; 4) value to the Medical Documentation Service; 5) cost; 6) language. In addition to these criteria, we have also been able to apply the results of an on-going journal usage study begun by the Librarian and carried on by a much appreciated volunteer.

The Serials Department has transferred many journal subscriptions originating in the British Commonwealth from an agency in London to one in Switzerland. This action was taken both to improve service and to eliminate foreign draft charges. The agency in Switzerland maintains a bank account in New Jersey, thereby allowing its clients to do away with foreign drafts. We have also transferred about a hundred current European subscriptions to our Swiss agency from another European agent. Our Swiss agent's handling fees are consistently lower.

In December 1976, with the cooperation of the Medical Documentation Service, a revised system of processing newly-received issues was initiated. Journals housed in the Periodicals Room, about 450 high-usage titles, were given priority in the scanning procedure. As a result, the newest issues of each title get to the shelf more quickly.

In April 1977, two members of the Serials Department staff attended a workshop on the binding of library materials, sponsored jointly by the Mid-Eastern Regional Medical Library Service and the Library Binding Institute. The workshop included a tour of a bindery and a presentation of all factors that go into the making of a good binding. Both staff members found the workshop to be informative and, as a result, we were in a position to make more intelligent decisions about our binding practices. We had engaged the services of a second bindery to supplement the fine work done for us by a bindery used by the College for many years. The workshop helped us to realize that we could have our supplementary work done far better by another binder at very little additional cost to us. So far, we have been pleased with the results of this change.

CURRENTLY RECEIVED SERIALS

	Subscription	*Gift*	*Exchange*	*Total*
U.S.A.	574	327	41	942
Western Europe	778	51	99	928
Eastern Europe	170	22	66	258
United Kingdom & Eire	204	14	15	233
Asia (including Japan)	91	60	70	221
Latin America & West Indies	27	43	59	129
Canada	22	5	7	34
Pacific (Australasia)	16	8	9	33
Africa	7	8	11	26
Grand Total 1976-77 (July 1 - June 30)	1,889	538	377	2,804
Grand Total 1975-76 (July 1 - June 30)	1,958	523	379	2,860

Titles are included in this count only if issues were received during the period July 1, 1975 through June 30, 1977.

New Titles: A total of 109 new serial titles was added from July 1, 1976 to June 30, 1977 (88 in 1976-76).

Files Closed: A total of 106 files was closed between July 1, 1976 and June 30, 1977. This figure includes cancellations from several years.

Percentage of *Index Medicus* journals currently received: 75%.

22,657 separate issues were received, checked in and shelved. (23,691 in 1975-76).

Ellen Batty, *Head*
Serials Department

MID-EASTERN REGIONAL MEDICAL LIBRARY SERVICE

The ninth year of operation of the Mid-Eastern Regional Medical Library Service (MERMLS) was also the first year of a new three year contract with its funding agency, the National Library of Medicine (NLM). It was a year characterized by some new beginnings but also by a disappointing termination. A new governance structure became functional, new program committees were established, the Local Resource Librarian program was formalized, and the Division of the History of Medicine was organized to add a new dimension to traditional regional medical library services. Regretfully, the National Library of Medicine withdrew its nine-year support of regional reference service.

Planning and Administration. The composition of the nine-member MERMLS Governance Board was altered when two members resigned this past year. The Dean of the Medical School of the University of Pennsylvania was appointed to replace the Dean of Jefferson Medical College who resigned because of an extended illness. A representative had yet to be designated at the close of the fiscal year to replace the representative of the New Jersey Hospital Association, who resigned because of a change in positions.

The Governance Board met three times during the year, in October, December and May. In addition, there were numerous mailings from the Executive Director of the College of Physicians and the Director of MERMLS to keep the Board members informed of developments in areas under consideration.

The National Uniform Document Delivery Funding Plan was an agenda item at each of the Board's meetings. The Governance Board gave its unanimous backing to MERMLS staff proposals which rejected plans presented by NLM and proposed instead the introduction of a small user fee. Board members stressed that equal access to the

network must be maintained and that hospital administrators and users of the service must be adequately informed and forewarned of the need for user fees.

At its October 1976 meeting, the Board approved a set of policies governing the operation of the Board itself. These policies pertained to the creation of Board policy, the standardization of definitions of ambiguous terms, communications with NLM, and selection of key MERMLS personnel. The definition of the term "affiliate" proved to be a controversial issue for Board members. MERMLS does not reimburse its Resource Libraries for document delivery service provided to affiliates. When the Resource Libraries were asked to provide a list of affiliates according to the terms of the definition, a consistent approach was not taken. After much debate, the Board finally settled on the criterion that an affiliate is designated by the symbol "M" in the *Directory of Approved Residencies.*

Shortly after the Board was created, the task of developing specific plans was assigned by the Board to four program committees. These committees, representing subregionalization, audiovisual coordination, extension services, and MEDLINE coordination, were asked to submit reports at the October Board meeting. Two committees presented plans which contained budgets. The Committee on Extension Services proposed to compensate the Local Resource Librarians for time and expenses when engaged in activities on behalf of MERMLS. The Committee on Audiovisual Coordination proposed to implement a limited audiovisual duplication and loan program to be based at the University of Pennsylvania Medical Library.

The Board approved the proposal from the Committee on Extension Services but asked that the proposal from the Committee on Audiovisual Coordination be revised to remedy some misgivings expressed by Board members. The revised proposal was approved by the Board at its December meeting and subsequently both proposals were forwarded to NLM for funding authorization. A letter was received from NLM in February postponing a decision on the two proposals until after they were rewritten providing more explicit detail and evaluation procedures. MERMLS staff reworked the Extension proposal for submission shortly before the end of the fiscal year. The Audiovisual proposal will be rewritten for submission in FY 78.

The activities of the Committee on MEDLINE Coordination are discussed under the section On-Line Services Network Management. The Committee on Subregionalization met once and identified a number of specific service areas which seemed appropriate for further decentralization. The Governance Board felt it could not evaluate the Committee's proposal without knowing the cost for implementation of each recommendation. The Committee was asked to develop a more detailed proposal with a budget and present it at a future meeting of the Board.

Also reviewed by the Board was the termination of support by NLM of regional reference service. The Deputy Associate Director of Extramural Programs attended the May Board meeting to explain the NLM decision and to give the Board members an opportunity to react. The Board unanimously approved a motion to go on record as regretting the NLM decision to terminate funding for regional reference service and to encourage the continuation of reference service by the College of Physicians.

The above review of the items of business considered by the Board in FY 77 indicates that the Board has been actively engaged in seeking solutions to the problems facing the region. At the same time, the Board has had to

come together as a cohesive unit and to gain a surer sense of its role. Efforts to further identify and implement the role of the Board in regional medical library management will be a primary objective in the coming year.

Planning on the state level was significantly advanced when the State Library of Pennsylvania established a Council of Pennsylvania Library Networks. The primary purpose of the Council is to promote cooperation among library networks, cooperatives, and consortia when such cooperation will result in improved service to the clientele of the constituent libraries and to the Commonwealth generally. MERMLS was pleased to be one of the twelve organizations invited to sit on the Council. Thus far, the State Library has used discussions at Council meetings to help develop priorities for use of Library Services and Construction Act Title III funds and to determine the steps to be taken to implement the *Drexel Plan for Library Cooperation in Pennsylvania.*

Document Delivery Service. The often repeated message that federal funding will not be adequate to meet the steadily increasing demand for document delivery did not go unheeded. A concerted effort was made by many libraries in the region to channel their requests elsewhere rather than relying on MERMLS as the sole provider of their document delivery needs. Knowledge of what journals are available in a given area is a prerequisite to the local sharing of resources. Among the area groups to have developed union lists of their journal holdings are: the Central Pennsylvania Health Sciences Library Association, the Cooperating Hospital Libraries of the Lehigh Valley Area, the Health Information Library Network of Northeastern Pennsylvania, the MLA-Pittsburgh Regional Group, the Pittsburgh-East Hospital Library Cooperative, the West Metropolitan Consortium for Health Information and Library services, and the Wilmington Area Biomedical Libraries Consortium. The importance of these groups' union lists in promoting the sharing of resources cannot be overemphasized.

The sum measure of what primarily has to be attributed to local resource sharing was a decline in the number of requests filled by MERMLS to 46,796 from 51,065 the year before. This eight percent decrease is more significant when compared with the four percent increase registered in FY 76 and the twenty-three percent increase registered in FY 75. (A history of MERMLS document delivery volume is represented in the appended charts.) Also noteworthy in contributing to the decline of MERMLS requests was an increase of twelve percent in the number of non-reimbursable institutional requests filled by the College of Physicians and its two Pennsylvania subcontractors.

Attention was focused all year on developing a viable alternative to the plans presented by NLM to assign document delivery funding responsibilities. Each of the two plans proposed by NLM was analyzed by MERMLS staff and reviewed by the MERMLS Governance Board. The prime consideration was the probable effect on Region III appropriations and in turn on Region III participating libraries. The possibility of replacing the NLM subsidy with a subsidy from the state or another agency is nonexistent in this region. Therefore, what is not received from NLM will have to be recovered from libraries which make use of the service.

Since some kind of a user charge seemed inescapable, the MERMLS Governance Board began discussions of when, how much, and by what mechanism a document delivery fee would be introduced in the region. To assist the Board in their deliberations, a questionnaire was distributed in January to elicit feedback on the effect of a range of fees

on participating libraries. The results of the questionnaire were presented to the Board at their May meeting and, based on this information, a unit charge of twenty-five cents per quota stamp effective November 1, 1977, was approved.

The small fee was judged prudent for two reasons. It would ease in the concept of a fee to a population accustomed to free service, and it would give MERMLS planning data on the effect of a fee on document delivery volume. The latter is considered essential for determining what the upward adjustment of user charges will be in the future. It was felt that the gradual imposition of fees would give both the requesters and the providers of the service more time to adjust and to plan budgets, and would hopefully lessen the time between the initial expected drop in volume and the anticipated recovery.

The State Library of Pennsylvania sponsored a series of three interlibrary loan workshops across the state and invited MERMLS to be one of the program presenters. The workshops were designed to familiarize participants with interlibrary loan procedures and networks, and to provide a forum for participants to identify interlibrary loan problems and exchange ideas. The workshops provided MERMLS an opportunity to reach an audience of academic, public and school librarians, many of whom previously had known little or nothing about MERMLS. The last workshop in the series was videotaped and is available for loan from the State Library.

Regional Reference Service. With respect to the three-year contract, regional reference service remained an unresolved issue at the close of contract negotiations in the spring of 1976. Funding at a reduced level was appropriated for only the first year of the contract. Future appropriations were to be contingent upon an evaluation of the service to be conducted by NLM reference service personnel who would determine if the College of Physicians was uniquely qualified to render the services provided and whether reference services were effective in the centralized mode.

A change of plans by NLM resulted in the arrival of a site visit team at the College of Physicians on December 8, 1976, which was composed of the Region III Program Officer, the Director of the Medical Center Libraries at the University of Cincinnati, and the Acting Dean of the College of Library and Information Sciences at the University of Maryland. The team spent a portion of their day reviewing the operation of the Regional Reference Department and the remainder of the day in visits to four other departments within the College which provide College-funded reference services. The purpose of the visits was to show how the College had solved the problem of service to regional versus primary clientele and to demonstrate that the limitations placed on the type of service rendered by the Regional Reference Department were appropriate based on superior capabilities available elsewhere in the College.

The final reports from the site visit team were not shared with the College of Physicians. It is understood that the team acknowledged that the reference holdings of the College are extensive and unique in the sense that many of them are not duplicated in other Pennsylvania or Delaware libraries. The service was also acknowledged as being competently staffed. However, the major contention was that the service provided was a normal, expected service, typical of that carried out by any major health resource library. This conclusion was reached despite evidence provided to the visitors that no major health resource library in Region III offered comparable service to non-affiliated individuals or institutions. Subsequently, it was revealed that this contention was based

primarily on conclusions drawn from discussions with some resource libraries not in Region III.

A rebuttal was prepared for submission to NLM and letters were written to the medical school libraries in the region to document their policies on the limitation of reference services outside their own institutions. All efforts to the contrary were unavailing and support from NLM for regional reference service was withdrawn with a phase-out period to end on June 30, 1977.

The February issue of the *MERMLS News* carried the announcement of the withdrawal of NLM support. In April, a letter was sent to 152 libraries which had used the service during a prior six-month period and these libraries were asked to participate in a cost-sharing arrangement with the College of Physicians in order that reference service might continue. The response from the region was favorable enough that the College elected to continue reference service to regional clientele in the coming year and to underwrite any deficit which might result.

The responsibility for overseeing reference service to regional clientele passed from the MERMLS Governance Board to the Library Committee of the College of Physicians on July 1, 1977.

All former staff members of the Regional Reference Department are to be commended for the dedicated and exemplary reference service which was provided to the region over a period of nine years. The final year was a most difficult one due to the termination of support and due to a reduction in personnel from one and a half to one full-time-equivalent reference librarian. The workload almost equaled the year before in the number of reference searches, 1158 in FY 77, 1284 in FY 76, and actually increased in the number of manually compiled bibliographies, 126 in FY 77, 96 in FY 76. In addition, the staff continued to contribute reviews of new reference books to the *MERMLS News* and assisted the Extension Librarian in updating the "Basic Reference Skills and Tools" workshop which was presented twice during the year.

On-Line Services Network Management. The ongoing development and expansion of MEDLINE network required extensive revisions to the MERMLS MEDLINE Regional Plan. The revisions were essential, since the plan suggests standards to be met by institutions making application to join the MEDLINE network. The Chairperson of the MERMLS Committee on MEDLINE Coordination appointed a Subcommittee to Revise the MEDLINE Regional Plan. A draft version of the revised plan was prepared for submission to NLM in March. Once the plan is approved by NLM and by the MERMLS Governance Board, it will become a part of the standard On-Line Application Packet which is sent to all prospective On-Line Search Centers.

The first annual update session for the continuing education of the region's search analysts was held at the College of Physicians in September. Forty-five search analysts attended the Continuing Education Program which was presented by the College of Physicians Search Analyst.

The widespread interest in the Continuing Education Program and the many constructive comments received from the Program's attendees prompted the appointment of a Continuing Education Subcommittee. Responsibility for planning the second update session was given to the Subcommittee which early in 1977 distributed a questionnaire to survey the region's search analysts for topics they would like to see developed for the next program. The program is scheduled for October 1977.

A much needed directory of On-Line Search Centers in Pennsylvania and Delaware was compiled for distribution by

the MERMLS office. A general statement was included on the procedure to follow in obtaining service from an On-Line Search Center. A survey made of the region showed that 90 institutions (primarily hospitals) have established service arrangements with On-Line Search Centers. This arrangement is preferred by many hospitals whose volume of search requests does not justify in-house access to the NLM data bases.

The MERMLS office responded to twelve requests for On-Line Application Packets during the past fiscal year. Three institutions completed the application materials for submission to the MERMLS Committee on MEDLINE Coordination, which is responsible for acting on proposals from prospective centers. The Committee endorsed two of the proposals but temporarily deferred endorsement of the third to give the applicant time to act on the Committee's recommendations. The three institutions applying to gain admittance to the MEDLINE network were: Air Products and Chemicals, Allentown, Pennsylvania; Veterans Administration Hospital, Coatesville, Pennsylvania; Veterans Administration Hospital, Philadelphia, Pennsylvania.

For the past two years, no new centers have been established in western or central Pennsylvania. There are only five centers located in this entire area. Attempts to have MEDLINE demonstrated locally have met with little success. For this reason, MERMLS committed resources to an active demonstration program in western and central Pennsylvania aimed at increasing awareness of the capabilities of MEDLINE and at promoting the hospital as an On-Line Search Center. Several hospitals requested On-Line Application Packets as a direct result of the demonstrations. A record number of 757 people attended 37 demonstrations, of which 16 were held in western and central Pennsylvania, 15 in eastern Pennsylvania, and 6 in New Jersey and Delaware.

Extension Services. A new Extension Librarian joined MERMLS as replacement for the Extension Librarian who resigned at the beginning of FY 77. The Extension Librarian traveled extensively throughout Pennsylvania, Delaware, and southern New Jersey to introduce herself to the region and to become familiar with the region's health science libraries, resources and programs. The Extension Librarian provides the centralized portion of MERMLS education, training and consultation services. She also coordinates the decentralized portion of the program which is carried out by the librarians who attended the 1975 MERMLS sponsored Leadership Institute.

The MERMLS Committee on Extension Services has primarily been concerned with decentralized extension services. The Extension Librarian, at the request of the Committee, distributed a memorandum which identified the activities expected of Local Resource Librarians (formerly referred to as Leaders, or participants in the Leadership Institute). These activities include local needs assessment, consultation through telephone, correspondence or site visits, and presentation of workshops on library skills.

The Committee identified geographic areas where additional Local Resource Librarians were needed. In FY 77, MERMLS designated one additional Local Resource Librarian to serve the Pittsburgh area. The high concentration of health care facilities in this area required the services of two librarians. The Committee studied the placement of Local Resource Librarians in relation to the boundaries of Health Service Areas (HSA), and identified one HSA district which lacks a designated librarian. A search is underway for appropriate candidates to serve in HSA IX. The Committee recommended that Local

Resource Librarians observe the same geographic boundaries as established for the HSA.

The Committee's major effort of the past year was to prepare for submission to NLM the "Proposal of the Committee on Extension Services to Fund the Local Resource Librarian Program." The proposal called for NLM to reimburse the institutions employing Local Resource Librarians for time spent in providing workshops and on-site consultations to other institutions. In the proposal, the Committee called for semiannual meetings of the participating librarians and for their attendance at special training programs. The proposal marked a significant step toward the formalization of the program. It identified the role of the Local Resource Librarians and the procedure for designation of participating librarians; it presented detailed forms for reporting activities, and it outlined the mechanism for evaluation of individual participants and of the program itself.

Appropriate training is considered by MERMLS to be a prerequisite for teaching workshops. To satisfy this requirement, MERMLS urged the Local Resource Librarians to attend the week long Program for Educational Planners (PEP) sponsored by the New England Regional Medical Library Service. Three Local Resource Librarians along with the MERMLS Extension Librarian attended the 1977 PEP session in Boston. The Extension Librarian and one of the Local Resource Librarians also attended the Medical Library Association's continuing education course "Teaching Skills for Library Educators."

Reports documenting the activities of the Local Resource Librarians were sent to the Extension Librarian, who included the data in MERMLS quarterly reports to NLM. The fifteen Local Resource Librarians provided 98 consultations, taught or coordinated 7 workshops, and attended 107 meetings pertinent to their activities.

As indicated above, the Extension Librarian made a significant effort to reach all geographic parts of the region. The breakdown of MERMLS consulting visits was as follows: eastern Pennsylvania, 23; central Pennsylvania, 3; western Pennsylvania, 15; Delaware, 3; southern New Jersey, 4. Twenty-one consultations were also provided to recipients who traveled to the College of Physicians.

MERMLS cooperated with several other organizations to offer eleven workshops during the year. MERMLS staff served as instructors at all but two of the programs which covered such topics as reference service, interlibrary loan, media utilization, and preservation of library materials. The geographic breakdown of workshops was: eastern Pennsylvania, 5; central Pennsylvania, 3; western Pennsylvania, 2; Delaware, 1. MERMLS staff attended 66 meetings of local, state, regional, and national groups and actively participated in many of the programs. Over one third of these meetings were concerned with interlibrary cooperation, resource sharing or the organization and development of health science library consortia. There were four new consortia formed during FY 77: Laurel Highlands Health Science Library Consortium, Medical Information Consortium of Kent and Sussex, Montgomery County Health Sciences Library Consortium, and Pittsburgh-East Hospital Library Cooperative.

Several institutions in the region submitted excellent grant applications to NLM during FY 77. The first award under the expanded Improvement Grant program was made to the Laurel Highlands Health Sciences Library Consortium based in Johnstown, Pennsylvania. In addition, three libraries prepared Improvement Grant applications as

single institutions. One was withdrawn, another was approved and awaiting funding, and the third has not yet been notified. Four Project Grant applications were submitted with one not approved, one withdrawn, and two approved and funded. The two recipients were the Joseph W. England Library of the Philadelphia College of Pharmacy and Science, and the West Metropolitan Consortium for Health Information and Library Services. Institutions in the region also made successful applications to funding sources other than NLM. The Wilmington Area Biomedical Libraries Consortium received Library Services and Construction Act funds to support development of a computer-derived union list of serials, and the Robert Packer Hospital in Sayre, Pennsylvania, received an award from the Guthrie Foundation to initiate a library circuit rider program. *MERMLS News* has been used to alert librarians to the grant programs of NLM and other funding agencies. Abstracts of Project Grant applications and announcements of other proposals are regularly highlighted in the newsletter. This sharing of ideas is intended to encourage other readers who may wish to develop proposals of their own.

Audiovisual Coodination. The new Extension Librarian came to MERMLS with a strong background in the utilization of non-print materials. Shortly after joining the staff, she attended the Regional Medical Library Audiovisual Consultants' Seminar in Omaha, Nebraska. The Seminar was sponsored by the National Medical Audiovisual Center and included sessions on selection and acquisition of software, copyright, bibliographic and physical management of software, planning learning resources centers, hardware systems, internal budgeting, external funding, workshops and continuing education, and development of a model for audiovisual consultants' efforts. After completion of the Seminar, the Extension Librarian was designated an RML AV Consultant for the region.

Another training session was held in February 1977, and was attended by the Audiovisual Librarian at Thomas Jefferson University and by the Coordinator of Library Services at Montefiore Hospital in Pittsburgh. MERMLS then designated these librarians as additional RML AV Consultants. The services provided by the Consultants included dissemination of information about audiovisuals through workshops, *MERMLS News* and individual consultations, reference service concerning audiovisual materials, and promotion of audiovisual resource sharing. The most significant contribution made by the Consultants during FY 77 was the development of the workshop "Non-print Resources for Health Science Libraries." The workshop was given twice in the spring of 1977, once in eastern Pennsylvania and once in central Pennsylvania. The program covered media reference service, evaluation and acquisitions, cataloging and AVLINE. The workshop was team-taught by the Audiovisual Librarian at Thomas Jefferson University and the Extension Librarian. The RML AV Consultants also contributed to the "Media Graffiti" column, a regular feature of *MERMLS News* which highlights recent developments in non-print biomedical communications.

During FY 77, the Committee on Audiovisual Coordination focused its efforts on development of a proposal to NLM for support of audiovisual resource sharing in Region III. The proposal recommended the development of a loan program based on duplication of selected health science videotapes. The original selection was to be made from the media holdings of the University of Pennsylvania Medical Library, and the collection was to be expanded as

other libraries made their audiovisual holdings available for duplication. The proposal was returned by NLM for further clarification.

During the past year, MERMLS continued to build an audiovisual collection to support continuing education for health science librarians. Three audiocassette and four slide/tape programs were added, as was a subscription to the *SWLA/CLES Current Awareness Journal,* which provides abstracts of the current library literature on audiocassettes. MERMLS audiovisuals loans to health science libraries totaled 84 in FY 77.

Publicity. MERMLS received national publicity during the past year when the *Bulletin of the Medical Library Association* published an article on the 1975 Leadership Institute. The article, "The MERMLS Leadership Institute for Hospital Librarians: A New Concept in Extension Service," was written by the former Director of MERMLS, the former Extension Librarian, and the educational psychologist who helped plan the Institute. The article reviewed the techniques used to develop leadership skills and discussed the results of the extensive evaluations of the Institute sessions. Glenn Snelbecker, Ph.D., a psychologist and one of the co-authors, is currently working with MERMLS on the evaluation of the Local Resource Librarian program.

MERMLS was publicized in a media format as well as print during FY 77. The Head of the Regional Photocopy and TWX Section and one of the Interlibrary Loan Assistants produced a slide/tape, *What is MERMLS?* for their work at the Drexel University Graduate School of Library Science. The slide/tape introduces the viewer to MERMLS document delivery, reference, on-line, and extension services. *What is MERMLS?* was shown at Drexel University and at a meeting of the MLA-Pittsburgh Regional Group. MERMLS plans to update the slide/tape and continue its use.

The Extension Librarian serves as editor of the monthly publication, *MERMLS News.* During her first year as editor, the Extension Librarian chose to retain the regular features of the newletter which, as MERMLS primary communications medium, reaches over 800 institutions and individuals. Although MERMLS staff provides most of the material, contributions have been actively solicited. During FY 77, the majority of contributors were MERMLS Local Resource Librarians. Jean Antes furnished "Circuit Riding in Pennsylvania," Gertrude Lorber furnished the regular column "Reading Tips for Hospital Administrators," and Helen St. Clair furnished "Title III Funds Awarded." Additional articles were contributed by College of Physicians staff members and informal reports were contributed by librarians throughout the region.

Division of the History of Medicine. The Division of the History of Medicine began operations in January of 1977 with the arrival of the newly selected Director, Ronald F. Kotrc, Ph.D. Under the terms of the agreement in the contract with the National Library of Medicine, the College of Physicians received start-up funding for the Division with the understanding that during the first three years of its operation, the College would pursue alternate funding sources that would assure fiscal resources for the continuing operation of the Division. The College has made very considerable progress toward this end during the past year. The underlying concept of the study of contemporary issues in historical perspective has great appeal to foundations and private benefactors.

Research. The Division is now producing a *Guide to the Archives and Manuscripts of the Library of the College of Physicians.* Funding for this project was generously provided by the Commonwealth Fund in the form of a

grant of $28,000. The project archivist is Miss Stephanie Morris, formerly of the Franklin Institute. Miss Morris is receiving editorial assistance from Mrs. Ellen Gartrell, who, as Curator of the Library's Historical Collections, can draw upon her extensive knowledge of the uncatalogued historical material in the College Library. The completed *Guide* will be published by Neale Watson Academic Publications, New York City. Work on the volume should be completed by September 1978, with publication expected in December of that year.

Archives. Planning is now under way for the continuation of the archives program, once the *Guide* to the College's own collections has been completed. Initial investigation has revealed large amounts of medical/historical archival material in other institutions within the region which has not been catalogued. Grant proposals are now being developed that will enable the College of Physicians to function as the center for the development of archival description of this material, and as an advisory body with reference to the preservation of such records.

Simultaneously, the Division of the History of Medicine is encouraging the Fellows of the College to consider the deposition of their own professional records in the Historical Collection. In recent months, a notable contribution was made by a former president of the College, T. Grier Miller, MD.

Publications Program. It is essential that one of the primary functions of the Division of the History of Medicine be a research and publications programs, out of which a teaching program will eventually develop. The publications program has two facets in addition to the archival work described above: the *Transactions & Studies of the College of Physicians,* and monograph series allied with it.

The *Transactions & Studies* is currently being edited and produced at the College of Physicians. An effort is now being made to augment the editorial staff and to acquire, from a wide range of scholars, materials for publication. The purpose of this effort is to improve the quality and interest value of the content of this historically significant publication. Manuscripts are being assembled to produce a new series of the journal, which may be expected to attract a large number of subscribers. The costs of production have become such that it is necessary that *Transactions & Studies* become financially self-sustaining within the next few years.

Two monographs to be published by the College of Physicians are in the planning stages. One is a series of readings in the history of medicine, the other is a pictorial essay of the Mutter Museum, one of the few remaining anatomical and pathological museums in the country.

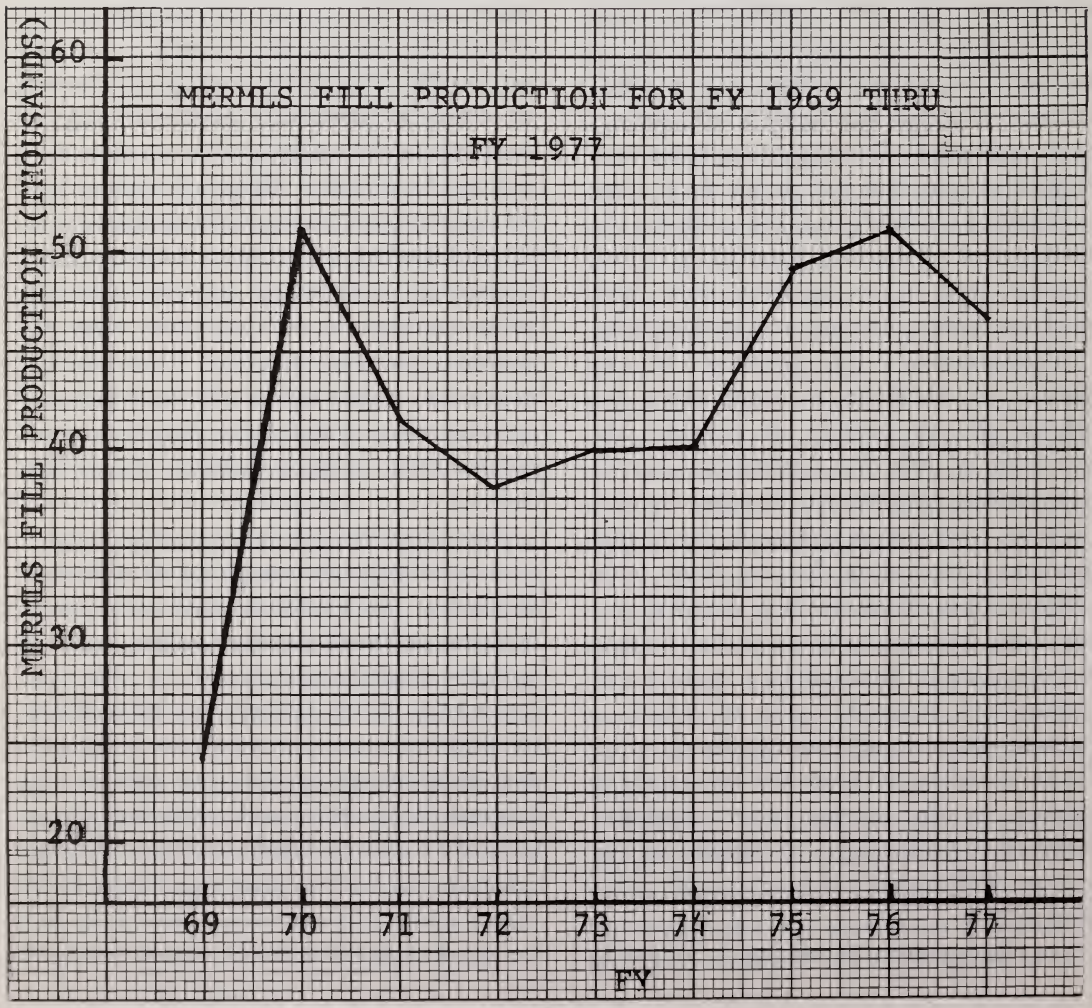
Joint Symposium. Planning is under way for a joint symposium on Humanities in the Clinical Setting which is to be held at the College of Physicians at the end of March 1978. Participants will be drawn from the regional medical schools. Presentations, pertinent case histories, and ethical considerations will be given by specialists invited from medical schools across the country.

Conclusion. In summary, major accomplishments were made by MERMLS in developing an organizational structure to facilitate regional decision making and to initiate programs responsive to the user community. It was, perhaps, too optimistic to think that proposals could be both developed and implemented in the first year of the contract. We look forward to the coming year when we expect to have many more tangible achievements for our planning efforts.

MERMLS PRODUCTION 1974/75-1976/77

Service	1976/77	1975/76	1974/75
Document Delivery			
Received	63,881	67,068	64,410
Referred	13,500	12,404	11,635
Returned	1,627	1,934	2,025
Rejected	1,958	1,665	1,431
Filled	46,796	51,065	49,319
Fill rate	76%	78%	78%
Filled, 0 day	81%	62%	82%
1-4 days	98%	94%	99%
Cleared, 0 day	53%	43%	64%
1-7 days	97%	85%	100%
Reference			
Quick reference questions	4,582	4,746	6,004
Reference searches	1,158	1,284	2,178
Bibliographies (manual)	126	96	106
Tranining & Consultation			
Workshops	11	6	12
Meeting & Consultations	135	95	102
MEDLINE orientations	37	24	15

June H. Fulton, *Director*
Mid-Eastern Regional Medical Library Service



ON-LINE BIBLIOGRAPHIC SEARCH SERVICE CENTER

The center continues to be very active, handling about 400 requests per year. These requests often are searched through multiple files. Besides having access to all the NLM databases (MEDLINE and its BACKFILES, TOXLINE, CANCERLINE, etc.), the center has access to the many databases supplied by Systems Development Corporation (SDC) and Lockheed Information Systems (these include *Biological Abstracts, Chemical Abstracts* and *Psychological Abstracts* as well as others). Searches are done on a fee-for-service basis, charges being calculated on the amount of time spent in doing a search. We are also contemplating access of the Bibliographic Retrieval Services, Inc. (BRS), files in the near future.

Ruthanne T. Henner,
Search Analyst

MEDICAL DOCUMENTATION SERVICE

Shifts in services rendered by the Medical Documentation Service during the year continued to reflect changes in biomedical information needs of its clients. The variety and depth of services provided for each client have increased with the changing needs of the industry. With the advent of composition and printing capability last year, the department has also been able to meet increasing demands for services from new and old divisions and departments of the College.

SDI Services. The department has continued to be the only service in the country to provide a comprehensive, "customized" program to the pharmaceutical industry, medico-legal, industrial, and health-related fields. As in the past, all periodicals received by the College Library are carefully scanned by scientifically and linguistically skilled members of the professional staff for interest profiles outlined by the clients. A given profile may include one or more related chemicals, products with similar components or related pharmacological activities, disease entities, or other concepts in health-related disciplines. Profiles are carefully outlined according to the interest of the client to specify the type of publication the client wishes to know about: human or animal studies, English language or all languages, adverse reactions, etc. In addition to the citations of articles found, the final product sent to the client may include a computer printout, magnetic tape programmed to the specifications of the client's own data base or system, and, in many instances, indexing or translations of the data found in the articles reported. Copies of documents are usually delivered to the client as back-up for the scientific effort represented by the indexing and other services performed in relation to the article.

Indexing techniques may vary according to the client's needs, from keywording to detailed analysis of the literature, and may include with the index terms a form of data extraction and final summary of the findings.

The skills of almost every member of the MDS staff contribute to the quality of the final product delivered to the client. Biomedical Literature Scientists scan the journals and select the pertinent articles, and others of this staff keyword, index, annotate, and translate when required. This activity is coordinated by Dr. Harriet E. Rockwell, who also provides technical back-up to the Director.

For many years, Mrs. K. Bernice Odom has given of her special bibliographic knowledge and skills, as Coordinator of SDI and Reference Services, to keep up with the increasing demands of the clients making use of this form of MDS services. She has also been responsible for developing retrospective

search strategy with other members of the scientific staff with diverse scientific backgrounds.

The national and international use of MDS services continues to grow. Attorneys from all over the United States have come to accept the retrospective search services rendered by MDS as supportive data for their caseloads. We continue to provide SDI services to a Rehabilitation Center in Japan, and Search Services to a Health Center in South America.

This year brought to MDS its largest expansion program in the last 11 years, with the advent of a major client in the pharmaceutical industry, The Upjohn Company. After searching the country over for a "one stop" service center, and evaluating responses to their queries to other MDS clients, the company selected MDS as the major provider of medical information services. In a recent company publication, circulated to some 25,000 people, MDS is cited as the "Philadelphia Connection making it possible for Upjohn employees to know sooner than ever before, what the medical and scientific communities are saying about Upjohn products and concerns." Under serious consideration on their part is the possibility of interaction of computer terminals between Kalamazoo and MDS for increasing the value of what might be considered the "ultimate in product monitoring services."

In the first year of this program, some 11,000 articles were reported and indexed, with data backup in the form of coded information on magnetic tape and copies of articles where appropriate. About five MDS staff members have been devoting most of their time and effort to this program, including the Administrative Assistant, Miss Marilyn Hagist.

Abstracting Services. MDS continued to select articles relating to cystic fibrosis, to abstract them and to prepare final copy for the printing of the Cystic Fibrosis Foundation's *Quarterly Annotated References.*

Many of the SDI clients require abstracts of foreign-language articles, and these have been provided routinely as a part of the total SDI package according to the needs of the individual clients.

Retrospective Search Services. The demand for these searches of non-current literature by MDS clients continued to expand, particularly in the pharmaceutical and medico-legal disciplines. One cannot help but conclude, from the increasing volume of requests from a wide geographical area, that "word-of-mouth" is our best advertising medium.

Reference Services and Document Delivery. Document delivery has become, with the greater demand on SDI services and data analysis, an increasingly important and necessary service. Clients legitimately expect to receive a broad spectrum of related services from a single source such as MDS. The use of telecopier (facsimile transmission over telephone wires) equipment for prompt response to requests is becoming more popular as a way of avoiding delays in mail deliveries and waiting time for response. This is particularly important to clients located in areas geographically remote from source libraries. Miss Hagist and Mrs. Odom monitor this service for both response time and identification of material required.

Data Extraction, Analysis and Indexing. These services are now more fully integrated with the SDI services than they have been in the past. This function has been adequately described in the section of this report devoted to SDI services.

Translations. The translating capability of the staff was increased this year by addition of a new staff member, Mr. Robert Asthon, whose language skills complement those of

Dr. Daniel Turner. This activity has become an integral part of the total SDI service, as well as filling specific translation requests.

Editing and Publishing Activities. The Director of MDS continues as Editor of the *Drug Information Journal,* with Dr. Harriet Rockwell as Associate Editor and Mrs. K. Bernice Odom as Editorial Assistant and Advertising Manager. The *Fellows' Forum,* the communicator of College activities, is also typeset and printed as a function of MDS.

With the loss of Dr. Robert Jones' editorial direction of the *Transactions and Studies of the College of Physicians,* an Editorial Board, is being established made up of Mr. William F. Chaveas, Dr. Ronald Kotrc, Dr. Harriet Rockwell and MDS Director Alberta D. Berton. As Managing Editor, Mr. Chaveas will set policy and oversee the publication; Dr. Kotrc and Dr. Rockwell will cooperate in such editorial functions as determining acceptability of submitted manuscripts and final editing; and Miss Berton will direct the flow of production, subscription fulfillment, and other business aspects of the publication.

"Current Readings in World Literature in Dermatology" has appeared regularly in the *International Journal of Dermatology* with an MDS byline. Numerous requests from all over the world for documents demonstrate the usefulness of this unusual bibliographic approach, which reports literature of interest to the dermatologist that does *not* appear in the usual dermatological journals.

New Activities. After a year of experience with the photocomposition equipment acquired from Addressograph-Multigraph, we are acquiring a new piece of equipment, representing an advance in the state-of-the-art, to increase MDS capability and speed in composition for graphics and batch-sorting of regular SDI activity. When this equipment

Three Year Comparative Statistics of MDS Activity

Service Rendered	July 1, 1974 to June 30, 1975	July 1, 1975 to June 30, 1976	July 1, 1976 to June 30, 1977
Scanning references reported (SDI) — selective dissemination of information	21,524	19,785	28,314
Number of SDI profiles	110	101	125
Number of clients served in SDI	22	20	21
Abstracts (English & Foreign)	5,063	7,468	1,975
Retrospective Literature Searches (Manual)	200	257	239
On-Line Data Base Searches (Computer based)	35	35	180
Interlibrary loan	285	289	271
Reference service (Recorded by number of requests)	99	200	1,080
Telecopier service (No. of requests)	112	200	244
Indexing and data analysis	4,295	6,410	8,136
Editing and medical writing	26	36	84
Photocomposition	66	85	144
Translations	167	184	183
Printing requests (brochures, meeting notices, programs, college activities)	36	75	462
Document delivery requests	28,863	27,465	39,239
Publications (No. of issues)	10	20	22
Data Processing	27	61	62

is installed, the department will have three CRT terminals for input on floppy diskettes, a Shaffstall converter to transmit the information stored on the diskettes, and a communications terminal for direct access to an IBM 370 computer via telephone lines.

The complete Pitney-Bowes mailing system has been more than helpful in successfully meeting mailing requirements for College activities. Comprising folder, nester, inserter and postage meter, this system provides the final touches to the printing capability available in the department with the Addressograph-Multigraph electrostatic total copying system. MDS brochures, library forms, College programs, Continuing Education activities and programs, metering daily mail, major bulk mailings, *Fellows' Forum,* etc., are now routine operations in the MDS complex.

The College Fellowship file is maintained on a computerized data base that is updated and supported within MDS. It provides a modern approach to controlling data relative to the membership of the College and the annual automated billings for membership dues. Included in this data base of Fellows are electoral year, date of birth, various mailing addresses, specialty, class of membership, dues information and other data deemed necessary to the file.

The Director of MDS continued on the Board of Directors for Documentation Abstracts, Inc., as Editor of the *Drug Information Journal,* and this year as Operations Chairman for the Annual Conference of the Drug Information Association to be held in Philadelphia in June of 1978, and on the Program Committee of the National Federation of Abstracting and Indexing Services Annual Conference in March.

Staff members are listed in the Directory table for the library. Because of the large expansion program, there are many new members of the staff, and regrettably, as happens every year, we have lost several excellent people.

Alberta D. Berton,
Director

1976/77
STATISTICAL SUMMARY

Inventory

	1976/77	1975/76
Accessioned items:[1]		
Incunabula[2]	421	421
Manuscripts	1,410	1,401
General	279,809	276,043
Pamphlets	12,245	11,871
	293,885[3]	289,736
Unaccessioned items[4]		
Reports	28,822	28,822
Theses	66,086	65,688
Reprints, leaflets & AV materials	229,008	228,985
	323,916	323,495

Accessioned acquisitions:

1976/77: 4,149 volumes (2,518 by purchase; 1,404 by gift; 227 by exchange) (books, 1,512; periodical volumes, 2,263; pamphlets, 374)

1975/76: 4,452 volumes (2,763 by purchase; 1,473 by gift; 216 by exchange) (books, 1,651; periodical volumes, 2,399; pamphlets, 402)

Unaccessioned acquisitions:

1976/77: 421 items (theses, 398; microfiche and non-print, 23)

1975/76: 421 items (theses, 411; microfiche and non-print, 10)

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[1]Accessioned items in this library comprise the total number of bound volumes and such unbound pamphlets as have been cataloged as separate bibliographic units regardless of their size.

[2]The Library owns 423 incunabula, but there are two instances of two bound together, reducing the number of accessioned volumes.

[3]Included in these figures are the following collections which are on permanent deposit in the Library: Gross Library, 3,976 accessioned items; Parry Library of the Obstetrical Society of Philadelphia, 217; Mütter Museum, 200.

[4]Only numbers for dissertations and cataloged microfiche and non-print materials have been added to figures established in previous years, as it has not proved feasible to keep accurate records of the materials, not separately cataloged, which are frequently added to the collection.

READERS' USE OF THE LIBRARY

LIBRARY HOURS: The Library was open from 9:00 A.M. to 5:00 P.M. Monday through Friday. The following legal holidays were observed: Thanksgiving, Christmas, New Year's, Washington's Birthday, Memorial, Independence, and Labor Days.

Visitors	1976/1977	1975/1976
Reading room	5,737	5,441
Periodicals room	882	1,147
Totals	6,619	6,588
Intra-mural Circulation[1]	25,434	16,886
Extra-mural circulation		
Original loans		
Regional	1,779	1,943
Registered institutions	4,270	4,227
Registered individuals	3,079	2,538
Totals	9,128	8,708
Photocopies (articles)		
Regional	31,719	34,345
Library	18,167	19,577
Totals	49,886	53,922

(1) Circulation figures are no longer recorded to differentiate between use of books and journals. Through the years the ratio of journal to book circulation has been approximately 3 to 1.

INSTITUTIONAL REGISTRANTS

The College Library acknowledges the support received from the registration fees of the following institutions which share the operational costs of the Library.

NON-PROFIT INSTITUTIONS

Abington Memorial Hospital
Allentown Hospital Assoc.
Altoona Hospital Memorial Library
Bryn Mawr Hospital Medical Staff
Chestnut Hill Hospital Medical Staff
Children's Hospital of Philadelphia
Delaware Valley Hospital
Alfred I. du Pont de Nemours Institute Foundation
Albert Einstein Medical Ctr. Medical Staff
Emergency Care Research Institute
Franklin Institute
Geisinger Medical Center
Germantown Dispensary & Hospital (Doctors' Library)
Hahnemann Medical College
Harrisburg Hospital
Health Services Council, Inc.
Hospital of the University of Pennsylvania
Institute for Cancer Research
Institute for Medical Research
King Faisal Specialty Hospital & Research Ctr. (Saudi Arabia)
Lankenau Hospital
Medical College of Pennsylvania
Memorial Hospital of Roxborough
Mercy Catholic Medical Center
Metropolitan Hospital
Mount Sinai Medical Center (Miami Beach)
Naval Air Development Center
Parkview Hospital
Pennsylvania College of Podiatric Medicine
Pennsylvania Hospital
Pennsylvania Hospital (The Institute)
Philadelphia College of Osteopathic Medicine
Philadelphia General Hospital
Robert Wood Johnson Foundation
Shadyside Hospital Medical Library (Pittsburgh)
Temple University School of Medicine
Thomas Jefferson University
Université de Montreal
University of Pennsylvania School of Medicine
Wills Eye Hospital

CORPORATE INSTITUTIONS

Adler, Barish, Daniels, Levin & Creskoff
Adria Laboratories, Inc.
Air Products & Chemicals Inc.
American Cyanamid Co. (Lederle Labs)
American Cyanamid Co. (Princeton, N.J.)
Anapol, Paul R.
Auerbach Associates (AAI)
Beasley, James E.
Bernstein, Bernstein, Harrison
Betz Laboratories, Inc.
Biological Abstracts
Boehringer Ingelheim Ltd.
Brown, Connery, Kulp, Purnell & Greene
Campbell Institute for Food Research
Cappel Laboratories, Inc.
Carter-Wallace Laboratories
Chrono-Log Corporation

Ciba-Geigy Corporation
Cohen, Shapiro, Polisher, Shiekman & Cohen
Colston, Larry A.
Computer Horizons, Inc.
Cooper Laboratories, Inc.
Corning Glass Works
Council for Tobacco Research
F. A. Davis Company
Dechert, Price & Rhoads
Dorland & Sweeney, Inc.
Dow Chemical Company
Drinker, Biddle & Reath
E. I. du Pont de Nemours (Haskell Labs)
E. I. du Pont de Nemours (Lavoisier Labs)
E. I. du Pont de Nemours (Stine Labs)
E. I. du Pont de Nemours (Technical Library)
ESB Incorporated
Endo Laboratories, Inc.
Excerpta Medica (Princeton)
Extracorporeal Medical Specialties, Inc.
FMC Corporation Chemical Group
Feldman & Feldman
Frank, Margolis, Edelstein & Scherlis
Freedman, Borowsky & Lorry
General Electric Company
Geometric Data Corporation
Germantown Laboratories, Inc.
Goldstein, Evelyn
Haines, Barton A.
Hal Lewis Design, Inc.
Harleco
Harper & Row (Maryland)
Harvey, Pennington, Hertig & Renneisen Ltd.
Haws & Burke
Hercules Incorporated
Hoechst Pharmaceutical Company
Hoffman-La Roche, Inc.
Hourigan, Kluger & Spohrer Associates
ICI Americas Inc. (Atlas Library)
ICI Americas Inc. (Hanby Library)
Information Company of America
Institute for Scientific Information
Interamerica Corporation
Intermed Communications (Nursing '77)
Intermedica Communications, Inc.
International Pharmaceutical Corporation
Johnson & Johnson
Kolsby, Wolf & Gordon
Krimsky, Luterman, Stein & Levy
La Brum & Doak
Lea & Febiger
Liebert, Short, Fitzpatrick & Lavin
J. B. Lippincott Company
Arthur D. Little, Inc.
Litvin, Blumberg, Matusow & Young
Livesey, Joseph R.
Lurie, Joseph
McNeil Laboratories, Inc.
Manchel, Lundy & Lessin
Mead Johnson Research Center
Medi-Computer Corporation
Mel Richman, Inc.
Mendel & Schwartz
Merck Frosst Laboratories
Merck Sharp & Dohme (Rahway, N.J.)
Merck Sharp & Dohme (West Point)
Meritz, Wm. L. Associates
Merovitz, Samuel
Merrell-National Laboratories
Monheit, Rosenfield & Mammuth
Morgan, Lewis & Bockius
Narco Scientific Industries, Inc.
Narco Avionics
Norwich Pharmacal Company
Obermayer, Rebmann, Maxwell & Hippel
Ortho Diagnostics, Inc.
Ortho Research Foundation
PPG Industries, Inc.
Pechner, Dorfman, Wolffe, Rounick & Cabot
Pennwalt Corporation
Pepper, Hamilton & Scheetz
Perskie & Callinan
Pilling Company
Procter & Gamble Company (Winton Hill)
Procter & Gamble Company (Miami Valley Labs)
Procter & Gamble Comapny (Ivorydale)
Quaker Chemical Corp.
Raynes, McCarty & Binder
R. J. Reynolds Tobacco Company
Richter, Syken, Ross & Levant
Rodale Press, Inc.
Rohm & Haas Company (Bristol)
Rohm & Haas Company (Phila)
William H. Rorer, Inc.
Rutter, Thomas B.
Sandoz, Inc.
W. B. Saunders Company
Schering Corporation
Scott Paper Company
G. D. Searle & Company
Shein & Brookman
Shuster, Morris
Smith Aker, Grossman & Hollinger
Smith Kline & French Laboratories
Squibb Institute for Medical Research
Stone, Paula
Stradley, Ronon, Stevens & Young
Travenol Laboratories, Inc.
Upjohn Company
Warner-Lambert Pharmaceutical Co.
Weinstein & Factor
White & Williams
Wyeth Laboratories, Inc.
Xienta Analytical Labs. Inc.

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The number of donors to the current collection during the year was 96. The Library is indebted for gifts of books, pamphlets and unbound periodicals to the following: Academy of Medical Science, The "Stefan S. Nicolau" Institute of Virology, Mrs.

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500-Year Jubilee Celebration — The University of Uppsala

By JOHN P. HUBBARD, M.D.*

September 28, 29, and 30, 1977, were the culmination of the 500-year anniversary of The University of Uppsala. Upon this occasion, The College of Physicians of Philadelphia was honored by having two of its Fellows present to receive honorary degrees.

These three jubilee days were beautifully planned, flawlessly organized, and conducted with a charming, characteristically Swedish combination of formality, pageantry and enjoyment of the occasion. Above all other features of these memorable days was the gracious hospitality of the University extended to its guests by the Rector Magnificus, Professor Torgny T. Segerstedt, the Promotors designated by each of the several faculties, and the members of the faculties who were identified by the color of their name badges. In a more direct and personal manner, Professor Gunnar Ström was the member of the Faculty of Medicine to whom those of us representing the field of medical education are so deeply and enduringly indebted.

Immediately preceding these three days of the University's Jubilee Celebration, the Association for Medical Education in Europe (AMEE) held its annual meeting at the University of Uppsala on September 26-28. Under the leadership of Dr. Ström and the Organizing Committee, including also Professor Henry J. Walton of Edinburgh, Chairman of AMEE; Dr. Tama Fülöp and Dr. Robert Wiedersheim of the World Health Organization; and Dr. Jorgen Nystrup of the Nordic Federation for Medical Education, the aims of this conference were directed to the following objectives:

(1) To bring together medical teachers and students and other persons interested in innovations in medical education.
(2) To present reports and materials concerning educational experiments, developments, and experiences.
(3) To offer an opportunity for constructive group work in special areas, which may lead to general conclusions and recommendations.

Medical educators from medical schools throughout Europe had been invited to submit brief working papers which were duplicated and distributed in advance of the meeting for study by the two hundred

*President, College of Physicians of Philadelphia; President Emeritus, National Board of Medical Examiners; Professor Emeritus, University of Pennsylvania.

participants attending the conference.

The last day of the AMEE conference, September 28, became the first of the three days of the Jubilee Celebration. Of the total number of 102 Doctores Honoris Causa, 20 were from various fields of medicine; of these, 10 were from the United States. Four Honorary Doctors were specifically designated to represent medical education: Drs. Spiros Doxiades, President of the Institute of Child Health in Athens; John R. Ellis, Dean of the London Hospital Medical College; George E. Miller of the University of Illinois; and myself, listed as President of the College of Physicians of Philadelphia (see accompanying picture). At lunch we were guests of the Faculty of Medicine at one of the student clubs known as the Goteburg Nation.

The four Honorary Doctors representing medical education. Left to right: George E. Miller, John P. Hubbard, John R. Ellis and Spiros Doxiades.

After enjoying the reindeer meat and wine, which were more delicious than conducive to sharp attention to afternoon speakers, the medical conference reconvened. As the last event of the AMEE meeting, the four M.D. Doctores Honoris Causa were each called upon in turn to give prepared talks. Upon request of Dr. Ström and in keeping with the theme of the conference, "Innovations in Medical Education," I reviewed the new program in continuing medical education developed jointly by the College of Physicians of Philadelphia and the National Board of Medical Examiners, and known as a Practice Related Educational Program. The innovative features of this program which led to the invitation to include it in a European conference on medical education are: (1) the manner in which the educational content is related to a profile of the physician's individual practice, (2) the evaluation of its effectiveness determined by a comparison of a pre-test and a post-test, and (3) the provision of learning materials for the identified needs of the individual physician for study at home base.*

In recognition of the honor to the College of Physicians of Philadelphia in being thus represented in the celebration of Uppsala University's 500 years, I took advantage of the opportunity to call attention to the fact that this was not the first or only association between this historic University and the College of Physicians of Philadelphia, which, although much younger, is looking forward to it own approaching bicentennial. There have, in fact, been three Presidents of the College of Physicians of Philadelphia who have had direct relationship with the University of Uppsala, two in earlier years in addition to the present occasion.

In the year 1761, Adam Kuhn, a young student in Philadelphia who aspired to become a physician, left his home to study at Uppsala under the guidance of Linnaeus. The master thought so well of his student that he named a species of American thistle after him. Upon learning of this, I have thought it

*John P. Hubbard, M.D., 1978, Profiled Continuing Education, *Trans. Stud. Coll. Physicians* 45(4):190-195, April.

appropriate that this thistle, the Kuhnia, should be added to our historic herb garden at the College of Physicians since Adam Kuhn, after returning to Philadelphia and having become the first Professor of Materia Medica and Botany at the University of Pennsylvania, was one of the Founding Fathers of our College of Physicians in 1787 and later its third President. Upon concluding my formal paper, I called upon Professor Holmdahl, the Pro-Rector of the University of Uppsala, to receive a copy of a bas-relief of Adam Kuhn, the original of which is in the collection of the College of Physicians of Philadelphia. Yet another association between the University of Uppsala and the College was at the time of the 100th anniversary of the death of Linnaeus, when another one-time President of the College, the renowned surgeon, Dr. W. W. Keen, was one of two from the United States who were awarded honorary degrees.

In this recent celebration of Uppsala's quincentennial, another Fellow of the College of Physicians of Philadelphia was also honored. Dr. Walter B. Shelley, Professor of Dermatology at the University of Pennsylvania, received an honorary degree because of his prominence in his own field and his associations with the University of Uppsala.

The second day of Uppsala's Jubilee, September 29th, began promptly at 9 a.m. in the distinctive central hall of the University, which was bedecked with beautiful flowers and colorful banners. Following a formal reception by the Rector Magnificus, the Nobel Prize winner, Professor Glen T. Seaborg, gave a featured address on "Knowledge and Survival." His speech was followed by those given by representatives from the University of Paris and the University of Copenhagen. There were then brief greetings from representatives of universities and academies from within Sweden, elsewhere throughout Europe, from the Soviet Union, Iraq, Tanzania, Turkey, and the United States, including a greeting from Upsala College, East Orange, New Jersey.

It was a colorful occasion, all those taking part in the ceremonies attired in academic gowns of varied hues and distinctive design or, in the traditional custom of Sweden, white tie and tails with decorations. A choir accompanied by an orchestra presented a Cantata to accompany the academic processions that opened and terminated the ceremony and with other movements that served as interludes.

One of the greetings — among a total of about 100 — was presented by Professor Gunnar Ström in his capacity as Vice President of Kungl Vetenskapssamhallet i Uppsala (The Royal Academy of Arts and Sciences in Uppsala). This Academy, with its own building near the University and a limited, carefully selected membership, serves as a meeting ground for interdisciplinary scholarly gatherings. It was the location where we from the field of medicine were guests of Dr. Ström, once for lunch and again for dinner. There was such a sense of kinship between the spirit of this Academy and the spirit of our own College of Physicians that, with the permission of Professor Ström, I take pleasure in quoting his words as presented briefly but with rich meaning, especially for those of us from our College:

> Dear Professor Segerstedt,
> Rector Magnificus of Uppsala University,
>
> The Royal Academy of Arts and Sciences of Uppsala extends its warm greetings to the University of Uppsala on this great occasion. We hope that the University will never cease its important work
>
> to generate new knowledge and seek for the truth,
> to pass on such knowledge and wisdom to those who learn, and make them skilled in critical analysis as well as in free and creative innovation, and thereby
> to enable new generations to participate in the application in society of new knowledge and understanding, for the benefit of mankind and nature.

> Science is universal and requires not only deep but also broad knowledge, and holistic insight. A scientific outlook develops best when time is available and opportunities given for communication between scientists and disciplines. A free academy, such as the one which we represent here, seeks to play a role in scientific life by offering such opportunities.
>
> As a testimony of our dedication to the common mission, our Academy wishes to present this most famous University with our new book — called "The Scientist in Society" — in which is set out an analysis, by representatives of numerous scientific disciplines, of some of the important issues in society.

Following the morning ceremonies, all gathered for lunch in the State Room of Uppsala Castle, where we were honored by the presence of King Carl Gustav. At this time, a most impressive address was presented fluently in four languages by Mrs. Brita Nordlander, M.A., who, representing the Uppsala Community Council, called attention to the importance and significance of the bridge between the City and the University — that is to say the town and the gown. Actually, there is a river running through Uppsala, on one side of which is the City and on the other side the University where it has expanded during its 500 years of growth and development.

In the afternoon of the same day, still the 29th of September, the ceremonies continued in the Hall of the University with further addresses and the first performance of Allen Petterson's Twelfth Symphony — a magnificient symphony almost too powerful for the size of the central hall in which it was heard.

After a hurried return to our hotel and change to the prescribed dress of white tie and tails with decorations, we gathered for the Jubilee Banquet, having been instructed to be in our designated seats in Fyris Hall at 7:20 p.m., for at 7:30 p.m. a blast of trumpets announced the arrival of the King. When all present were well feasted and wined, we were honored by a welcome from the King, following which another blast of the trumpets marked the time to proceed to the nearby Castle for dancing to end the day, or, more accurately, to begin the third day of the Jubilee.

This third day of the Jubilee, September 30th, was designated as the Conferment Day. It opened with an unmistakable signal of its significance for Uppsala and for those of us who were there to receive honorary degrees. At precisely 7 a.m., the blast of a cannon reverberated throughout the City. The blast was repeated every ten seconds for seventeen minutes, 102 blasts of the cannon and 102 honorary degrees to be bestowed. The great day had begun!

Having spent most of the morning receiving instructions and rehearsing the protocol for the official conferment of degrees, we gathered again in academic gowns and, with orchestral accompaniment, proceeded to our places on the platform of the main hall. After a most cordial welcome by the Rector Magnificus, the Conferment Address was delivered by the Professor of Medical and Physiological Chemistry, Torvard C. Laurent. The title of his keynote address was "Modern Medicine is Founded in Basic Research." His message was most impressive and should be — and I hope it will be — published and widely available for study and reflection. Then came the conferment of degrees. According to tradition, each Faculty of the University was represented by one of its members designated as Promotor. The Promotor for the Faculty of Medicine was Professor Laurent who had given the Conferment Address. The fact that this main address was presented by a member of the medical faculty, plus the fact that one-fifth of the honorary degree recipients, 20 out of a total of 102, were in the fields of medicine, was evidence of the emphasis given to medicine, not only in the 500 years of history of the University but also, and perhaps more significantly, as it views its present and future role.

It may be said without any question of doubt or disagreement that the conferment of honorary degrees by the University of Uppsala is indeed unique. Each of us was called upon by name to step to the raised platform on which stood the Promotor of the particular Faculty. He then, in Latin or English — usually Latin — spoke words of praise for the recipient of the degree and then, in formal tradition, placed a specially designed handmade high silk hat upon the honorary doctor's head, at which point a blast of the cannon — the same one that had awakened us in the morning — reverberated from outside the hall. A golden ring was then given to each in accordance with tradition dating back to 1600, the ring carved with a motif symbolizing the different faculties —for the medical faculty, the staff of Aesculapius with the serpent coiled around it. A most impressive diploma was then presented with the words that we heard repeated for each:

Salve vir doctissime
Accipe pileum, signum libertatis.
Accipe anulum aureum, signum dignitatis ac pignus fidei.
Accipe diploma, testimonium honorum et privilegiorum.
Vale, paraclarissime medicinae doctor.*

However, "Conferment Day" was not over. After a hurried trip back to the hotel and a quick change to white tie and tails and evening gowns for the ladies, we were guests of the students for a final banquet at one of their clubs. As the evening progressed with the wine flowing freely, and after speeches from the students and words of thanks and appreciation from their guests, tables were removed and the floor cleared for dancing. Late at night (or early in the morning, as one wished to look at it), those of us who had to pack our party clothes for an early start to the airport said farewell to our hosts, but really not a final farewell; a couple of hours later, students joined us for an early breakfast at the hotel, still singing and still with the colorful ribbons and sashes of their student awards adorning their evening attire. So ended the Jubilee Days of Uppsala's 500-year celebrations and, as those of us who were privileged to be present flew home to our respective destinations, we began to find it difficult to bring ourselves and our thoughts back from the wonderful world of Uppsala.

*Welcome most learned gentlemen.
Accept the hat, a token of liberty.
Accept the gold ring, a token of rank and a pledge of good faith.
Accept the diploma, a testament of honors and privileges.
Fare thee well, most distinguished doctor of medicine.

Profiled Continuing Education*

By JOHN P. HUBBARD, M.D.†

Before turning to the topic listed next in your program, I cannot refrain from calling your attention to the fact that this historic occasion is not the first association between your venerable 500-year-old University of Uppsala and The College of Physicians of Philadelphia. Our College, although young in comparison, is looking forward to its bicentennial in 1987, and I suspect that recent events have made you aware of America's pride in bicentennials!

In the year 1761, Adam Kuhn, who aspired to become a physician, left his home in Philadelphia to study here at Uppsala under the guidance of Linnaeus. The master thought so well of his student that he named a species of American thistle after him.[1] Upon learning of this, I have thought it appropriate that this thistle, the Kuhnia, should be added to our historic herb garden at The College of Physicians, since Adam Kuhn, after returning to Philadelphia and having become the first Professor of Materia Medica and Botany at the University of Pennsylvania, was one of the Founding Fathers of our College of Physicians and later its third President.

Let me now turn to more recent events in the unfolding course of medical education.

Upon this auspicious occasion marked by celebrating five hundred years of history, those who have planned this meeting and selected as its theme *Innovations in Medical Education* deserve congratulations indeed for their wisdom in looking forward in the light of the record of the past. The title of the paper that I have been given the privilege of presenting is *Profiled Continuing Education.* Since this title involves a concept that is quite new, let me take a few minutes to be sure that we all have the same understanding of these words — at least the manner in which I shall use them.

First, let us look at some of the complexities of continuing medical education before we talk about profiling it. Today one hears much of the continuum of medical education. The impression is conveyed that there is a well-ordered sequence of educational experience from entry into medical school, progressing incrementally through the graduate education that takes place in teaching hospitals, and continuing thereafter throughout the professional life of the individual. However, as has been pointed out frequently at this meeting, a more realistic description recognizes three compartments of this educational sequence that have little relationship except insofar as one follows the other.

The first compartment is the traditional highly structured period of the medical curriculum under the direction of the medical school. Although it may vary from country to country and from school to school, it has a recognized beginning with admission to medical school and a well established termination upon graduation.

The second compartment is the period of graduate medical education, so-called quite naturally because it follows graduation from medical school. In America the term *graduate education* has largely replaced *postgraduate education,* since the word postgraduate does not distinguish between the graduate

*Delivered on the occasion of the 500-Year Jubilee Celebration of the University of Uppsala.

†President, College of Physicians of Philadelphia; President Emeritus, National Board of Medical Examiners; Professor Emeritus, University of Pennsylvania.

education in the hospital and the later years after the hospital-based period of training. Here, in this second compartment, the education and the training of professional skills are oriented largely, if not exclusively, to preparation for the individual's self-selected objective of practice in a specialty or in the general field of medicine. In this compartment there may or may not be close association with the medical school. In the university hospitals there is bound to be a close tie between the medical school department and the corresponding hospital service. In the teaching hospitals designated as affiliated hospitals, especially those at some distance from the medical school, the association may be quite remote. In any event the educational content, objectives, and duration are in large measure guided by the requirements for qualification for general or specialty practice.

The third compartment of this non-continuum is that which we are now calling continuing medical education, frequently referred to by its acronym as CME. This third compartment of medical education is, therefore, the lifelong education and continuing learning that is — or should be —a part of any professional career. Most simply put, it means keeping up with advancing knowledge and the ability to apply advancing knowledge through improved skills and techniques.

These then are the three compartments of medical education, and it appears evident that this compartmentalization does not differ very much from one part of the world to another: (1) the historically established medical curriculum under the authority of the university and the medical school; (2) the graduate education for the hospital intern or resident under the direction of the teaching services of accredited hospitals; and (3) the continuing medical education for the practicing physician who may be far removed from his formally structured years of education and far removed from medical centers and teaching resources.

I have endeavored to differentiate these three compartments of medical education in order to emphasize some of the problems of continuing medical education with which I now wish to deal more directly.

One of these problems in continuing medical education lies in the lack of a faculty directing its efforts in accordance with well defined educational objectives. To be sure, members of medical school faculties do give courses or participate in panel discussions or symposia. If, in addition, we should add all the courses offered by medical schools, specialty societies, hospitals, voluntary health associations and state medical associations in the United States, we come to a staggering total of 7,330 courses offered by 1,504 institutions as reported by the American Medical Association for the coming academic year 1977-78.[2] A bewildering array and variety of course announcements are therefore to be found cluttering the bulletin boards of hospitals, appearing in ever increasing number as advertisements in medical journals, and swelling the daily mail

Lacking an organized faculty for this third compartment of medical education, the action has been predominantly in the hands of the medical specialty societies, at least as we see it in the U.S.A. It is, in fact, the principal mission of these societies to keep their members currently informed about advances related to their specialty. One way of achieving this mission, which was introduced about ten years ago by the specialty societies, is the creation of sets of multiple-choice questions covering the several sub-specialties of the field. The idea was to offer to the members of the society an opportunity to test themselves and to learn thereby where they might have gaps in their knowledge of the subject that was thought to be important by

the teams of consultants who formulated the questions. References to current medical literature were keyed to each question so that the test-taker could turn to pertinent articles in the medical literature or chapters in a book that would serve as self-learning aids. This type of self-assessment and self-learning has become very popular among the American specialty societies with increasingly sophisticated computer-generated feed-back explaining why the wrong responses were wrong and why the response coded as correct was the better response.

Strong motives lie behind all this expansive proliferation of continuing medical education that sometimes seems as random as it is rapid. Prominent among these motives is the fact that both the public and the profession have accepted the principle that a stamp of approval of qualification for practice, having once been awarded, should not be considered valid forever after. A lifetime certificate serving as a license to practice or as recognition of qualification as a specialist is fast disappearing throughout the United States. Consequently, a variety of regulatory procedures is gaining ground, with the effect of mandating continuing medical education. State Medical Societies are requiring evidence of continuing medical education on the part of their members in order that they may continue their membership in the society. A sterner measure is that being adopted by state boards of medical licensure. (And let me remind you that a license or permit to practice medicine in the United States is under the legal authority of the individual states.) About one-third of our fifty states now have statutory regulations that require continuing medical education in order that the physician may maintain his license to practice his profession.

Although relicensure, or more specifically the threat of losing a license to continue the practice of one's profession, sounds very ominous, the basis of the procedure currently used to meet this requirement softens the threat. The American Medical Association has established the Physicians Recognition Award (PRA). This award is granted to any physician who gives evidence of having participated in continuing medical education sufficiently to acquire 150 credit points during the course of three years. One credit point is usually awarded for one hour of attendance at a lecture. Several categories of credit-points were established. The most important category, Category 1, is derived from participation in continuing medical education activities conducted by institutions with accredited sponsorship. Other categories include activities with nonaccredited sponsorship, medical teaching, publication of papers, and other "Meritorious Learning Activities."

In the regulations pertaining to the PRA, the keyword is ATTENDANCE. The physician attends a lecture, course or symposium; he then reports that he has participated in this activity. It is his own report of attendance that constitutes his record for the attainment of the required number of credit points for the Award.

Sometimes the participant is asked for an opinion about the lecture, course, or symposium; the accumulated opinions are spoken of as an evaluation. But any element of objective evaluation of the learning gained — or not gained — by the physician is lacking. Therefore, the question arises as to whether the PRA will continue to be accepted as an adequate indication of continuing competence of the physician for purposes of maintaining membership in a state society or renewing his license to practice his profession.

Furthermore, this record of attendance and the Physicians Recognition Award places this third compartment in sharp contrast to the other two. In the first compartment, the attainment of the educational goal is

acquisition of the university degree. The medical student has graduated and may now be called a doctor. Successful completion of the second compartment is marked by passing an examination that confers a license to practice medicine or to be certified as a specialist in a chosen field. The third compartment, however, has no mechanism for evaluation of the attainment of the educational objectives. We might compare this situation with that which would exist in the first (medical school) compartment of the continuum if an M.D. degree were awarded upon the basis of the student's record of attendance at a required number of lectures, laboratory exercises, and hospital ward rounds.

In a recently published, perceptive view of the future of the continuum of medical education, Dr. William Anlyan, one-time President of the Association of American Medical Colleges, speaks of this compartment of continuing education as currently fuzzy and ill-defined; yet, he states, it may well be the "sleeping giant" of medical education.[3] I see the situation somewhat differently — a giant, yes, but a giant that has awakened and does not yet know who he is or where he is going.

On this background and to give some sense of direction to this awakening giant, two institutions that are centered in Philadelphia, the College of Physicians of Philadelphia, to which I referred earlier, and the National Board of Medical Examiners, undertook an innovative project in continuing medical education. This program departs from the familiar custom of spreading before the physician a smorgasbord of courses, lectures, and symposia, each prepared as temptingly as possible and not infrequently offered at an attractive resort hotel with a nearby golf course or even as daily lectures on a cruise ship. The new and very different approach that is the subject of this paper has as its primary feature an identification of the specific learning needs of the individual physician. The first step is, therefore, a profile of the physician's practice. The educational component of the program is then cut to the pattern of the practice profile.

The design of this innovative program includes four major steps. The first step — the practice profile — is derived from a day-to-day survey of the conditions and problems the individual physician encounters in his practice. He is given a form on which he identifies the problem or presumptive diagnosis of each of 100 consecutive patients. All he has to do is to make a checkmark in one of thirteen categories that were agreed upon during the development of the program as covering the major fields of general medicine. The task calls for but a moment of the physician's time for each patient. These forms are then read by machine, the data are tabulated, and the profile of practice, based upon this series of patients, is clearly apparent. Perhaps the physician's profile will show that 50 percent of his patients were recorded as having problems related to the cardiovascular system, 30 percent respiratory disease, and 20 percent distributed among other categories.

The second step in the program is for the physician to identify for himself his learning needs in the major components of his practice as revealed by the profile. In the example with the profile that I have cited, the physician would presumably choose to test himself in the field of cardiovascular disease. This step consists of an examination made up of multiple-choice questions quite similar to the self-assessment examinations which, as already mentioned, are now popular among the specialty societies. A total of thirteen examinations were developed with the cooperation of the National Board of Medical Examiners and in accordance with the Board's recognized standards and techniques.

Each examination covers one of the major areas of medical practice listed on the form devised for the practice profile. After the examination papers have been machine-scored, the results are returned to the physician indicating to him in a very personal and detailed way where he may have become rusty in some aspects and unaware of new advances in other aspects of this major component of his own practice, as identified in his practice profile.

The third step, which is really the heart of the program, is the corrective learning specifically related to what the physician now recognizes as gaps in his knowledge of an important component of his own practice. As a part of his subscription to the program, he receives a list of references keyed to the test questions that he answered incorrectly. These may be references to journals or textbooks or they may be notations about the availability of pertinent audio cassettes, slide cassettes or video cassettes that are coming into such wide usage in continuing medical education.

Thus, the physician-learner's choice of education opportunities is affected by three components of learning: (1) the subject matter, (2) the time available for learning at his own home or office, and, perhaps most important, (3) individual preference in the method of learning.

The fourth step in this program is the feature so often lacking in continuing medical education. Following the learning phase, a self-evaluation of the gain in learning is accomplished by taking a second test covering the same health problem area tested at the beginning of the program. Great emphasis was placed upon assuring that the post-test was altogether equal to the pre-test, not only in content but also in difficulty. Only then could reliable comparisons of the results of the self-assessments before and after the instruction indicate whether or not the learning experiences were effective. The physician can then choose to move on to another major area of his own practice with another cycle of testing, learning and re-testing.

In closing, and by way of emphasizing the distinctive features of this innovative program, it should be noted that the program depends upon the physician's own practice, his own choice and style of learning, and his own approach to continuing medical education. The physician is shown his practice profile for a sample period of time and then he decides the area in which he wishes to focus his learning efforts. The physician himself selects the self-assessment and decides the areas for which he wants learning materials. He decides when he is ready for the post-instruction self-assessment, so that he may find out for himself how much he has learned through his own efforts. In short, the system provides the physician with objective data on which to base his own decisions for the kind of learning he himself considers most important. The fact that the specifically identified references or other learning materials are made available for corrective study and learning at home base appears particularly attractive for the physician at some distance away from the opportunities for continuing medical education so abundant in major medical centers. Finally, the *evaluation* of the self-learning — so often missing in continuing medical education — provides an element of confidence in the effectiveness of the program.

It is, in fact, this feature of evaluation that is the basis for the claim of an innovative program. Other forms of self-assessment and other forms of self-learning are to be found in abundance in the growing field of continuing medical education. But I know of none other that provides the earnest participant with as reliable an opportunity for an objective detailed documentation of the benefit that he

has gained from his own efforts based upon a profile of his own practice.

In closing may I express the hope that in Philadelphia we may look forward to continuing the associaton with Uppsala, which began over 200 years ago when Adam Kuhn studied here and inspired Linnaeus to name the Kuhnia. And now, I am proud to present to the University of Uppsala, upon the occasion of its 500th Anniversary, this bas-relief which I hold in my hand, showing the rather stern profile of Adam Kuhn, a devoted pupil of your great master Carolus Linnaeus in 1761. With this propitious start Kuhn was then the first Professor of Materia Medica and Botany at the University of Pennsylvania in 1768 and a Founder of the College of Physicians of Philadelphia in 1787. Professor Holmdahl, may I ask you in your position as Pro-Rector to come forward and receive this gift in behalf of your historic university.

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John Ashhurst, Jr., His Childhood Diary And Early Life

By DONALD C. GEIST, M.D.*

John Ashhurst, Jr., (Figure 1), the second son of John and Harriet Eyre Ashhurst, born in Philadelphia August 23, 1839, became one of the city's eminent nineteenth century surgeons. Among his collected papers in the Library of the College of Physicians of Philadelphia there is a diary, begun by him at nine years of age and kept for approximately ten months. He called it his "Journal" and it has much appeal, presenting an insight into the rearing of a Philadelphia boy in an affluent society in midcentury. His son, Dr. A. P. C. Ashhurst, tells us that John "kept a diary scrupulously for several years, 1846-52."[1] I have found no other, nor any reference to another.

The author hopes, by using entries extracted from the diary,[2] to show that John Ashhurst, Jr., and undoubtedly other children, were capable of keeping a diary in which they presented significant and interesting facts about themselves, their early education, training and family relationships. His early life, until the time of his graduation from college, is briefly portrayed, as well as those aspects of it which appear in the diary.

Fig. 1. John Ashhurst, Jr., M.D.
From the portrait collection of William Bradley, M.D. (Courtesy of the Library of the College of Physicians of Philadelphia.)

THE ASHHURST FAMILY

John Ashhurst (Sr.) was born in Philadelphia in 1892, the son of Richard and Elizabeth Hughes Ashhurst. He was a merchant and banker and entered his father's firm, Richard Ashhurst and Sons. He became a Director of the Philadelphia and Reading Railroad, the Farmer's and Mechanic's Bank and the Western Savings Fund. He was Chairman of the Philadelphia Bounty Fund Committee, 1862-65, a Trustee of the University of Pennsylvania, 1865-88, and a manager of the Episcopal Hospital in Philadelphia.[3,4]

In 1835, John Ashhurst married Harriet Eyre, the daughter of Manuel Eyre, whose residence was on South side of Chestnut Street above Ninth and whose country estate was the historic Grange[5] in Delaware County,

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some seven miles from the center of Philadelphia (Figure 2). Manuel Eyre was a well known merchant who was a partner in the firm of Eyre and Massey. His participation in early Philadelphia affairs included membership, in 1806, on a committee which drafted and sent to the President and Congress a letter protesting British interference with American ships. In 1813, he became a member of the "General Committee of Superintendence for the Protection of the River Delaware and the city of Philadelphia." In 1816 he was made a Director of the Bank of the United States.[6]

After their wedding, Mr. and Mrs. John Ashhurst lived for a few years on Chestnut Street, a short distance from the home of Mr. Eyre. Richard, their older son, was born in Naples, Italy, February 5, 1838. As children, John, Jr., and Richard held much affection for one another. Richard was more outgoing and friendly than John, who was quiet and reserved. They seem to have complemented one another in their childhood activities. Two more children, a son and a daughter, were born to the Ashhursts but died shortly after birth, a cause of much sorrow for their parents. Richard, John and their parents occupied the Grange as their summer home for a number of years. Richard was to become a distinguished Philadelphia attorney, a Shakespearean scholar, twice brevetted during military duty in the Civil War and, in 1906, appointed Postmaster of Philadelphia.[7]

Fig. 2. The main house at the Grange (circa 1850). From H. D. Eberlein and C. V. D. Hubbard, *The Grange. Portrait of a Colonial City.* New York: J. B. Lippincott, 1939. (Courtesy and permission of the publishers.)

Much of the children's practical education was obtained at the Grange,[8] where they collected and studied bugs, beetles and butterflies and their mother collected shells. John learned to ride the horses owned by the family and, with Richard, romped about the estate with their dogs. John had been taught to read at the age of four years, loved books, and early in his life became a frequenter of Penington's bookstore, a precursor of his adult avocation as an eager enthusiastic bibliophile. Later the family moved their city residence to Sixth Street below Walnut, East Washington Square, and the square became a favorite spot for the amusement of the children.

His mother played an important part in John's childhood. Carefully instructed in the accomplishments deemed necessary for the rearing of young ladies, she was talented in free-hand pencil drawing of landscapes and figures and gifted in botany. Mathematics, especially trigonometry and astronomy, were her favorite subjects. A fondness for music enabled her to become accomplished upon the harp and spinet. She was of a strong spiritual nature and strictly religious.

A delicate constitution prevented her participation in strenuous physical activities. It did not hinder her, however, from being a fine wife, mother and housekeeper. Her daily visits to the kitchen were omitted only when she was confined to her bed. Regular reading of the latest books, new magazines, and the daily papers held a prominent place in her life. Her love of the Grange is well indicated by this statement of her grandson, Dr. A. P. C. Ashhurst: "In 1845, Mr. Eyre died and not long afterwards, moved by the tears of his wife at the thought of losing the Grange, Mr. Ashhurst purchased it from his father-inlaw's estate." She sat in her wheelchair on the piazza of the main house for many pleasant hours and, when physically able, enjoyed the flower gardens, paths, trees and shrubs. Her only shortcoming, according to her grandson, was a lack of humor. But he added that this was supplied by her husband, and that they regularly complemented one another.

HEALTH, EARLY EDUCATION AND COLLEGE LIFE

Dr. Richard N. Harte, in his memoir of John Ashhurst, Jr., says that John was a delicate child, often suffering from gastric and intestinal complaints, which prevented his participation in sports. His adult photographs show him to be quite slender, and his height has been said to have never exceeded five feet eight inches. These physical proportions prevented him from fulfilling his desire to enter the field for Army service as they did not satisfy Army requirements.

John's early education was received in his home from his mother with the aid of tutors. His first introduction to a classroom occurred in 1855 when, at age fourteen, he entered the Department of Arts, later the College, of the University of Pennsylvania. However, his age at this time was not unusual, for many students entered college at thirteen or fourteen years of age.

College life[9,10] in these early days had many amusing and interesting aspects. Students engaged in considerable mischief and poor behavior, a great deal of it mere childishness. Provost Beasely, Dr. Patterson and Professor Thompson complained about the students rolling shot and pebbles on the wooden floors, bringing musical instruments and animals into the classrooms to distract both student and teacher, and ridiculing the professors behind their backs. The throwing of balls resulted in many broken windows, a costly matter for the college. Both student and teacher said that discipline was often poor or non-existent.

Organized athletic activity was not available to the students. Many of them chose

running for exercise and ran about the square upon which the school buildings were located, often several times daily. Skating on the river during the winter and swimming in the summer were other physical activities.

Interest in literary activity was stimulated by the formation of student societies such as the Philological Society, Philomathean, Zelosophic Societies and others, many of them short-lived. Drama interested the students and they produced plays, often writing and arranging the librettos themselves. Musical societies were formed for those so inclined. About 1849 fraternities came upon the scene, and by 1850 four were established at the University of Pennsylvania: Phi Sigma Kappa, Delta Psi, Delta Phi and Zeta Psi.

College commencements were open to public attendance. For more than a hundred years these were held in the Hall of the University and later, because of the need for more space, in Music Fund and Horticultural Halls. The program consisted of music, a variety of addresses, and student orations, some in Latin and Greek. Many Philadelphia citizens enjoyed these commencements.

A brilliant student, John Ashhurst, Jr., attained first place in his College class for all four years. His lowest mark was 14.09 and the highest, 14.997, on a basis of 15. Mathematics, physics, languages and chemistry were his favorite studies. Handwritten copies of his College essays are among his papers in the Library of the College of Physicians of Philadelphia. The subjects of these papers show considerable variety, a serious writing intent, and an enthusiasm for classical studies. Titles such as "Themistocles," "The Doctrines of Anaxagoras," "The Advantages of a Contemplative Life," "Wit and Humor," and "Sociality Natural to Man," uphold this statement. His later graduate thesis, "On Nervous Action," was so highly regarded by the faculty that they urged and helped secure its publication.

One of his favorite collegiate pursuits was membership and participation in the Philomathean Society. This organization was founded by the Senior Class in 1813 as a student intellectual society. Provost Dr. Frederick Beasely supported this project and the Trustees gave it their approval. It was first housed in the so-called "President's House," built for the use of the President of the United States but never so used, and acquired by the University of Pennsylvania as its early home. Eventually, the society was given rooms on the fourth floor of College Hall. With time, the society expanded its efforts to include debating, drama and literary exercises. The annual debates with a similar but younger group, the Zelosophic Society, drew large enthusiastic audiences. A fine library was acquired and later donated to the University's library. A committee of Philomathean published monthly the first continuous undergraduate magazine, called "The University Magazine," and continued to do so from November of 1875 until September 1881. John Ashhurst, Jr., became, in succession, the society's Secretary, Treasurer, First Censor, and Moderator. The last office had been held by his father and was later held by his son, Dr. A. P. C. Ashhurst — participation by three generations of the family. The society's activities continue to the present day and, in 1977, reminiscences about it were published in the *Pennsylvania Gazette.*

John Ashhurst received his B.A. degree from the University of Pennsylvania in 1857. At his graduation ceremonies in Music Fund Hall, he delivered the Greek Oration, receiving favorable acceptance from the audience and praiseworthy remarks from the news media. His admission to Phi Beta Kappa came after his college days. In 1893, at the first election of the newly formed chapter at the University of Pennsylvania, John was chosen

an alumnus member of Phi Beta Kappa.[11] Upon graduation from the College he entered the medical school of the University of Pennsylvania, where he began the development of his adult career.

THE DIARY OF JOHN ASHHURST JR.

John Ashhurst, Jr's., diary is handwritten in a small hard covered notebook with the title "Journal of J. A. Jr., Vol. 1," printed in double lined letters on the first page (Figure 3). Entries were made daily with few exceptions. Often he has corrected these, apparently displeased with his first choice of words. His vocabulary is large and varied for a nine-year-old boy. The handwriting is reasonably good and the sentences well formed, but punctuation is poor. Of interest is his almost constant use of the ampersand instead of the word, and the frequent use of *eat* for *ate*.

The following is his first entry in the journal:

> Saturday Sept. 9th 1848 Fine day. I have written in an old book for about three weeks, but now as papa has bought me a new book I have begun in it already; We had a ride yesterday & a fine game of hide & hoop in the afternoon, I did not press as heavy with my pen while I was writing my exercise this morning as I usually do which gave it a much better app-earance being light. We have had no ride today as papa came out for dinner & Joseph had to attend to the horse but we expect to have a game of hide & hoop in the evening. Old Watch has been very sick for some days & William Kanen shot him today; we are all very much grieved for his loss as he was a faithful old dog. Richard who had several times been in tears as he was greatly attached to him. We had a play in the straw this morning which we enjoyed greatly but which dirtied us pretty well.

As one reads the daily entries of John's diary, various aspects of his early life begin to

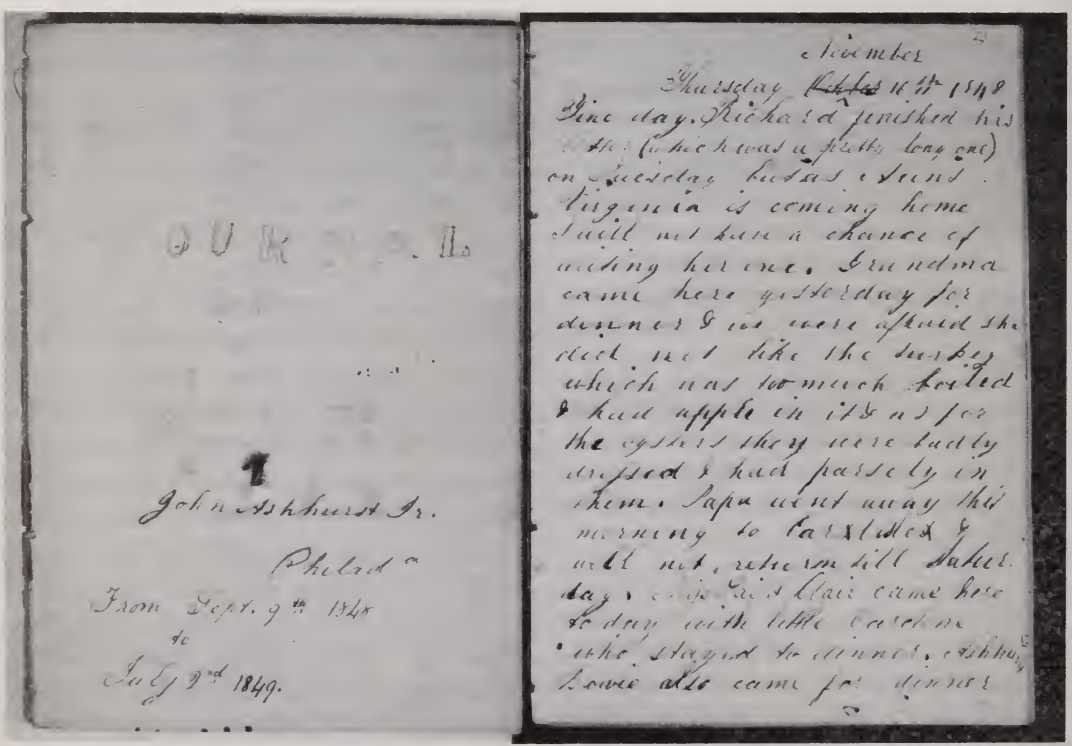

Fig. 3. The boyhood journal of John Ashhurst, Jr. From the Collected Papers of John Ashhurst, Jr., M.D. (Courtesy of the Library of the College of Physicians of Philadelphia.)

unfold.[12] He writes:

> Monday Sept. 11th 1848...We will not have any ride today as the carriage is gone to town & we would not think of riding without Joseph at present; but I expect that we will be able to have a game of hide & hoop this evening. We were disappointed in expecting Aunt Ellen and Aunt Virginia [Mrs. Charles Gibson and Mrs. Wilson Eyre] as they have deferred coming out till Wednesday.
>
> Tuesday Sept. 19th 1848...We had a ride yesterday & I rode "Taylor" [one of the carriage horses at the Grange] for the first time in my life. I would have liked him pretty well only as Joseph held the strap the two horses were very close together my leg got very tired as it was very closely pressed...
>
> Sunday Sept. 24th 1848...We sailed boats this morning & after that we took a walk when we came home we stayed at the seesaw & when Ashhurst and Richard [his cousin Ashhurst Bowie and his brother] were playing, "Harry, Harry has to get out of our castle," Ashhurst got his finger in Richard's mouth, knocking out a loose tooth and getting his finger bitten besides. In the afternoon we took a walk & Ashhurst fell down & hurt his head.
>
> Friday Sept. 29th 1848. Fine day & much warmer than usually, but I am afraid it is going to rain. Uncle Wilson went off somewhere this morning & has not come home yet. After dinner Richard threw apples at Uncle Wilson & I & we threw them back again & after that we picked 2 big baskets of horse chestnuts & 1 of apples. [Collecting nuts, eggs, fruits and flowers was a favorite pastime of these children.]
>
> Sunday October 8th 1848. After dinner we went to the "half-moon"[13] with mama & got a great many flowers which are plenty there. Towards evening we went down to the far gate & in coming back home we stopped & observed the stars under the direction of Richard but I am afraid the lesson did not do me much good.
>
> Friday October 27th 1848...In the afternoon we drew a little, I drew a good many honeysuckle leaves, which were rather hard...[14]

His enthusiasm for drawing was encouraged and aided by his mother. She instructed both sons, John and Richard, in free-hand drawing in a regular step by step fashion, i.e., one leaf, then several; one branch and then several; and finally the entire tree. John particularly enjoyed drawing churches, with their varied unusual windows and steeples. He apparently drew well.[14]

CHILDHOOD CURIOSITY AND IMAGINATION

The curiosity and varied interests of John and his cousins are indicated by him as follows:

> Monday October 16th 1848 Fine day. I went to town this morning & had 1 tooth pulled and 1 filed. After that affair was finished I went to the counting house [the place of his father's business] where I found Harry. We amused ourselves for some time pulling each other about in a clumsy sort of dray which made a great noise. After that we looked over a book of funny poems, the one that we read was about poor "Wilt Waddle." After that we looked over a book which I thought was very interesting. Then I went to Grandma's where I got fresh figs of which I I eat & brought the others into the country. After dinner papa bought me a small magnifying glass for 37 cts. Richard went shooting with Joseph & shot 4 birds some of them woodpeckers & the others smaller birds. They also got mushrooms but they were worm eaten.
>
> Wednesday October 18th 1848...We amused ourselves some time before dinner and all afternoon making bricks but though we were making them such a long time we did not succeed in getting them baked till I got 2 of the bricks at the kitchen fire where they got pretty hard soon but I broke 1 and I have now learned that we must put them inside the fire to make them red and nice.

They tried on two more occasions to make bricks but without success. After the third attempt, John appears to have become discouraged and remarked, "I am almost in despair about the bricks." His statement is surprising for he usually persisted in his childhood projects until he succeeded.

> Friday November 3rd. 1848. Fine day. We packed up a great deal this morning then we loaded the furniture-cars, & then after a little while we got into the carriage to go to town for the winter. This afternoon I unpacked a good deal & I feel quite at home now. Tech has 7 beautiful pups no longer than my hand & beautiful little creatures.
>
> December 18th 1848...Almost all my spare time is occupied with the new piano which came here last Saturday....
>
> Sunday Jan. 19th 1849...I played Blue eyed Mary on the piano for the first time today.
>
> Monday Jan. 29th 1849...I have begun today to play a peice with two hands on the piano, I am afraid it will take some time.

Eventually he became an accomplished pianist. His enthusiasm for music continued into his adult life, but his teaching and the practice of surgery did not then permit him time for the piano.

His childhood and the participation of his family in it are well portrayed in his diary. These children, like most, loved to play and enjoyed a number of games popular at the time, such as Hidey-Hoop, Shuttlecock, Prisoner's Base, Fox and Hand, and Everlasting. He amused himself with his toy soldiers and collections and was fond of doing imitations and acting, as we see in his journal: "Wednesday February 21st 1849....we crayoned in the afternoon after which I acted Dr. Valentine..." His cousins and friends joined him with similar enthusiasm. They walked about the Grange, and during the winter about Washington Square, adjacent to his home in the city. "Mama" and "Papa" often joined them and aided and abetted their activities, which enhanced their family life. He speaks of the family's Christmas celebration and the frequent visits of his aunts and uncles, who participated in their games, reading, and giving. Visits to museums, the Academy of Sciences, and the shows of magicians pleased him. He enjoyed the gifts, particularly the books received by him and his brother Richard. It was a closely attached and affectionate family from childhood to old age. His affection for them appears in the following note.

> Wednesday October 4th 1848 Fine day, at present Uncle Wilson and Aunt Virginia went away this morning & I am afraid I will miss Uncle Wilson's nose which I am in the habit of pulling every evening. We picked a big basket full of horse chestnuts and in the evening and after that I drew while Richard read.

Love of animals, especially the dogs and horses at the Grange, gave him special joy. He tells of finding a turtle. After playing with it for some time, he freed it, apparently having learned not to abuse animals.

PARENTAL AND FAMILY GUIDANCE

John enjoyed the benefit of a fine mother and father who not only provided for his needs but offered him excellent guidance and a gentle but persistent discipline. From them he learned patience, charity, the kindness of giving and the value of thrift. He tells of his mother giving each of the children thirty dollars to put with their money to buy stocks, but only on the condition that they give away the interest, and relates in his diary:

> Wednesday November 1st 1848...After dinner we went with Rebecca to Michael Gormley's wife to whom we gave a little wheelbarrow to give to 1 of her children; after that we played about Saunders till the carriage came when we rode home.

His family taught him the educational value of scientific exhibits and of visits to foster homes, where he learned about nature, science and some of the common problems of living, as he records in his journal:

> Tuesday December 12 1848 Cloudy day. After Mr. Chase[15] goes we are going to the Academy of Sciences with Dr. Griffith [Dr. Robert Eglesford Griffith, an uncle of John Ashhurst, Jr.] if it does not rain. I think what we saw there was well worth our trouble. It was a magnificent assortment of stuffed beasts and birds of very bright colors....[He continues his description for almost a full page and shows considerable aptitude for description.]
>
> Friday May 11th 1848 Aunt Katy and Aunt Virginia [Mrs. Thomas Latimer Bowie and Mrs. Wilson Eyre] came here for dinner and we went to the Foster Home in the afternoon; Mama went with us but did not get out of the carriage. There were 64 children there besides 2 that were sick; we took 2 lbs. of secrets there and distributed them among them. It is a large marble building, with a cupola & a splendid portico; most of the floor is covered with beautiful rag carpets.

JOHN'S MATURE INTERESTS

One gains the impression that John was a child of more than ordinary imagination and serious interest. Certainly some of the activities described in his notes were those of a more mature boy, as is evident in these entries:

> Tuesday Sept. 19th 1848...I am going to make a "temperance pledge" tomorrow & I have

persuaded several people in favor of it & who are going to sign it, when it is made....

Wednesday Sept. 20th 1848...I wrote out my pledge this morning. Richard does not quite approve of the way it is made but that does not make much matter as he is of the other party, but I expect to alter it so as it will be as he thinks right....

Saturday Sept. 23rd 1848...We had a ride in the afternoon & a temperance & intemperance meeting & both were very noisy, the people all being tired with the speech I made.

His temperance society was soon formed and included members of his family and those employees who wished to join. Little more is said about it by him, and eventually the society disbanded.[16]

Another project was his organization of a lending library for those who worked for his family. Dr. A. P. C. Ashhurst gives an interesting description of this venture: "He established moreover a lending library for these same domestics; the range of prices being one cent dues for one week, the proceedings, together with a weekly allowance for the same purpose from his mother, being devoted to the purchase of new books. This buying of books led to his buying books for himself, rather than only such as were suited to the minds of the gardner and farmer..."

THE INFLUENCE OF BOOKS IN HIS CHILDHOOD

Scattered through his diary are numerous references to books he read; many were received as gifts from his parents, uncles and aunts, apparently a family trait. Books were frequently read to these children, and his brother and cousins shared this enthusiasm for reading, as is evident in the following entries in his diary [his reason for the use of the asterisks is not apparent]:

Tuesday September 12th 1848...After lunch papa read a couple chapters out loud to us of the "Conquest of Mexico" & only left one chapter to be read in the evening....

Saturday December 30th 1848...*"Aunty Griffith gave Richard 'Napoleon and his Marshals' & to me 'Washington & his generals' & 'Flemish Tales.'

*Aunt Ashhurst gave Richard the 'Memoirs of the queens of France' & me 'Biography of Self-taught Men.' *Aunt Ellen gave Richard 'Helen Fleetwood' & me 'The Rockite'....

Friday March 9th 1849...We are translating 'Xenophon' every day but we do not get on with it very well. We are just going to read some of our French history....

Thursday April 12th 1849...On Tuesday papa brought a translation of Xenophon, we think it helps us a good deal in understanding it....Papa, Mama & Richard are very interested in Macaulay's History of England though, as I have not heard any of it, I don't know whether I would think it interesting or not....In Washington Irving's works we are reading the Sketch Book of 'Jeffrey Crayen.'

Thursday April 19th 1849...I read a good deal of Macaulay's History of England, which I think is much more interesting than Prescott's Ferdinand and Isabella. We have begun the Grecian History and Mama says she thinks I am lamentably ignorant on that subject....

Friday April 20th 1849...We have nearly finished 'Arnold's First Greek Lessons'; we have only got one more exercise in it, when we have finished it we are to do 'Sophocles Exercises'. I have finished the 2nd volume of Masterman Ready, & I intend to begin the 3rd volume today.

As one reads these notes, he becomes aware of the variety, quality and careful selection of the books given to these children for their education and enjoyment.

SPIRITUAL MATTERS IN HIS EARLY LIFE

His mother urged and guided him in this aspect of his life. He attended church regularly, read his Bible frequently and was taught to and did write and repreach the sermons he heard. Dr. A. P. C. Ashhurst describes this well: "....under the direction and tuition of his mother, my father used to record in his diary, and later in a special 'Sermon Book' what he could remember of the discourses he had heard that Sunday, and often so enthusiastic was he, that he would hurry home from morning church and be occupied in this 'reporting' the sermon until the afternoon service, at which as often as not, the morning subject was concluded in the second sermon; and the reporting of this

sermon would occupy the hands of the youthful scribe of eight or nine years until bedtime." John writes in his journal:

> Tuesday November 14th 1848 Fine day. It rained again on Sunday and I was not able to go to church but I wrote a sermon in my old sermon book and when Richard came I preached it....
>
> Sunday December 3rd. 1848 Fine day. Mama wants me to write a little account of what I hear in church; the text was this, "because these art lukewarm therefore will I spue them out of my mouth." "Lukewarmness engenders formality; it wounds Christ in his own house, when he expects joy he is grieved, when he comes to rejoice he goes away with sorrow...."
>
> Sunday February 25th 1849....Having met with the following facts, I though it proper to copy them down;
>
> The Holy Bible.

The Old Testament	The New Testament
Books-39	Books-27
Chapters-929	Chapters-260
Verses-23,214	Verses-7,959
Words-592,439	Words-181,253
Letters-2,272,800	Letters-838,380

Two more pages of similar statistics are recorded by him. Surely, John must have listened intently to the sermons he heard and read his Bible with enthusiasm and earnestness. His memory appears to be unusual for a young boy.[17]

CONCLUSION

John Ashhurst, Jr., shows in his boyhood journal that some children frequently possess unusual abilities, great imagination and often what one might call "childhood wisdom." They are, indeed, personalities in their own right. This was not generally understood until near the middle of the nineteenth century.

The diary presents not only a full and interesting story of John as a child, but also the important influence in his life of his parents, aunts, uncles, and cousins. It offers considerable insight into the development and formation of his adult life and career, for he became a man of excellent character and fine integrity and a skillful, competent writer, surgeon and teacher.

NOTES AND REFERENCES

1. Most of the information in this paper concerning John Ashhurst, Jr., and his family has been adapted from the unpublished biography of his father, written by Dr. A. P. C. Ashhurst, *The Life and Character of John Ashhurst Jr., by his son.* Manuscript in the collected papers of A. P. C. Ashhurst in the Library of the College of Physicians of Philadelphia.

2. *Journal of John Ashhurst Jr.* Manuscript in the collected papers of John Ashhurst, Jr., in the Library of the College of Physicians of Philadelphia.

3. Obituary Notice of John Ashhurst, Jr. Archives of the University of Pennsylvania.

4. J. L. Chamberlin, Ed., E. P. Cheyney and E. P. Oberholtzer, Special Eds., *Universities and Their Sons, University of Pennsylvania.* Boston: R. Herndon and Company, 1901.

5. H. D. Eberlein and C. V. D. Hubbard, *The Grange. Portrait of a Colonial City.* New York: J. B. Lippincott, 1939.

6. F. K. Willing, *The North American.* Philadelphia, June 9, 1912.

7. Papers and clippings of Richard Lewis Ashhurst, Archives of the University of Pennsylvania.

8. The Grange is located in Haverford Township, near Old Haverford Road and what is now City Line. It had a number of owners, the first being Henry Lewis, a Welsh Quaker who purchased the 550 acres in 1682 and built a house on the grounds. In 1782, it became the property of John Ross, and its greatest historic period was during his ownership. Ross named it the Grange, after Lafayette's house in France. Manuel Eyre purchased the estate in 1816. After Mr. Eyre's death in 1845, John Ashhurst purchased it from his father-in-law's estate. John Ashhurst, Jr., inherited the Grange in 1892 and his brother Richard in 1900. The Grange was famous for its lovely main house, beautiful flower gardens, handsome boxwood hedges, and many primitive forest trees, such as its tulip trees. In 1974 Haverford Township obtained the Grange in order to preserve and restore the property. It is now called "The Grange Estate," and future plans include its use as a cultural, ecological and educational center.

9. E. P. Cheyney, *History of the University of Pennsylvania, 1740-1940.* Philadelphia: University of Pennsylvania Press, 1940.

10. H. M. Lippincott, *The University of Pennsylvania. Franklin's College.* Philadelphia: J. B. Lippincott, 1919.

11. This information was obtained in personal correspondence with the Phi Beta Kappa Society in Washington, D. C.

12. Diaries kept by young children are not rare. In a limited search, I have found six written by children between seven and sixteen years of age. These are: *Diary of Anne Green Winslow, Diary of a Little Girl in Old New York* by C. E. Havens, and Theodore Roosevelt's *Boyhood Diaries,* all started at ten years of age. Sally Fairfax of Virginia began one at twelve years of age. Eric Sloan has presented the diary of Noah Baker, age fifteen, in his cleverly illustrated book. Alice Morse Earle states that John Quincy Adams' son kept a diary when he was seven years old (*Child Life in Colonial Days.* New York: MacMillan and Co. 1899).

13. This was a semicircular area along one of the paths of the Grange, planned and arranged for outdoor dinners and entertainment of guests during the warm seasons.

14. Dr. A. P. C. Ashhurst has stated that John's drawings were collected in a portfolio and kept for some time by his mother. I have been unable to find the portfolio or any other reference to it.

15. Mr. Chase, whom I have been unable to identify further, was the children's tutor.

16. It is of interest to note that while serving during the Civil War, John Ashhurst, Jr., requested transfer from the Chester U.S.A. Hospital to another one because of the use of alcoholic beverages by a number of the staff. He was transferred to Cuyler U.S.A. Hospital at Germantown. John was a life long abstainer from alcohol.

17. "Religion for the child was not confined to the life of the spirit; one does not read very far into the juvenile literature of the period before he discovers the sovereignty of religion in every phase of child life. Not only were his education, manners and morals motivated by theological concepts, but even his recreation and hygienic care were conditioned by the same principles. The major conclusion from this investigation is that the era of the American Revolution marked the beginning not only of political freedom of the American people, but also of the emancipation of the American child." Sister M. Kiefer, *American Children Through Their Books, 1700-1835.* Philadelphia: University of Pennsylvania Press and the John Winston Company, 1949.

Is There A New Medical Student?*

By RENEÉ C. FOX, Ph.D†

The position that I will take on this question is: Yes — not absolutely or without qualifications — but yes, on the balance, there is a new medical student. (However, to respond to this question in a valid and reliable way, we need more qualitative as well as quantitative, longitudinal data, a more long-range historical view, and a broader societal perspective than we currently have.)

The fact that we have come together to address ourselves to such a question strongly suggests that there are phenomena observable on the American medical school scene of the 1960s and 1970s to which we are mutually responding. To make this point in another way, it is unlikely that the College of Physicians of Philadelphia would have devoted an evening to a discussion on the "new" medical student in the 1950s. An important aspect of the phenomenon that we are exploring this evening is represented by the fact that present among us are numerous medical students and house officers who personify this so-called new medical student and physician, if he or she actually exists: young physicians and physicians-to-be who are deeply interested in this question; who would like to be new; and who are seeking an answer to this question about themselves and their medical generation. There is even a genre of doctor-book that has begun to appear, written by physicians who underwent their medical training in the 1960s and who are exploring their newness. These books have titles like *Calling Doctor Horowitz*[1] and *White Coat, Clenched Fist.*[2]

This brings us to the question of what is newness in this context? What are its parameters? The relevant variables that I would like quickly to consider with you are:

- The social backgrounds of medical students.
- How and why they decide on medicine as a career.
- The processes of training, and candidacy that they undergo prior to, and as prerequisite for admission to medical school.
- Their conceptions of what a good physician is, and of their chances of becoming and remaining a good physician.
- The medical education and socialization that students undergo in medical school, internship and residency, and their attitude towards it.
- Their self-presentation and self-conception.
- Their view of health, illness and medicine in the United States: its empirical and symbolic significance; how it is handled; how the medical profession is organized and functions; the role of the individual and the community in these matters.
- Attitudes towards medical and societal changes.

In these respects, how similar are medical students and recently graduated physicians of the 1960s and 1970s to those of previous decades? How different are they? The best comparisons can perhaps be made between the supposedly new students and physicians of the sixties and seventies, and their counterparts in the 1950s who, for reasons that we will not attempt to analyze here, were the primary subjects of the several major studies of becoming a physician that were

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conducted by social scientists some twenty years ago.[3] Given the remarkable rapidity and extent to which collective changes in student attitudes and outlook now appear to be occurring, in making such comparisons, we may have to further distinguish between new medical students of the 1960s and those of the 1970s. For there is a real possibility that there are significant generational differences, if not a generation gap, between them.

In raising these and other questions about medical students of yesterday, today, and tomorrow, we are also implicitly asking what are the short- and long-term implications of the attitudes, values, and aspirations of medical students for our national health picture and for the practice and progress of medicine. Logically and sociologically, it is entirely possible that medical students may be different, but that their presence in the medical profession may not change it or the health-care system.

Inventory of Newness/Non-newness

At the present time in the United States, there is an ill-understood avalanche of young persons interested in medicine, aspiring to become physicians, and applying to medical schools.[4] In 1975-1976, for example, 42,203 persons sought admission to U.S. medical school first-year classes, the equivalent of 2.8 applicants for each of the 15,365 acceptances offered. The great augmentation of persons striving to enter medical school first became visible in the 1960s. Many explanations have been given for this phenomenon, but they are largely speculative, personal, and impressionistic in nature. Medical school and medical student watchers are now suggesting that a slight downward trend in applicants has started, but they have not presented data-supported, probative interpretations of why this might be happening.

The ground-swell of applicants to medical schools in the 1960s and 1970s has contributed to a more intensely competitive pre-medical-school college experience for prospective applicants than was characteristic of the 1950s. In this connection, the 42,203 applicants to the 1975-76 first-year class filed an average of 8.65 applications apiece. Applicants each year have had increasingly outstanding academic credentials. The mean undergraduate grade point average of 1975-76 applicants was 3.24. There has been a steady rise in MCAT Science scores: since 1971, the mean Science score for all applicants has increased by 33 points, and for acceptees by 50 points. Despite the fact that a science major is not a prerequisite for admission and that the highest acceptance rates occurred for students whose undergraduate major was philosophy or who participated in an interdisciplinary program, 55% of the applicants in 1975-76 majored in either biology, chemistry or zoology. This figure seems to be as much a reflection of the difficulty in convincing students that they are not competitively disadvantaged by non-biological or non-chemical science majors as it is an expression of their primary intellectual interests.

Students comment freely and critically on what they regard as the many narrowing and deforming intellectual, social, and personal consequences of the overweening preoccupation with getting into medical school that pervades their pre-medical, college years. They express regret and disapproval about the frequency with which this obsessive concern may lead students to eliminate courses from their programs that are "not sufficiently biomedical," in which they cannot be assured of receiving a high grade. They are distressed by the ways that cut-throat competition can reduce intimacy with classmates and peers. And they are both sad and indignant about the cheating, or the

temptation to cheat, on examinations, in laboratory work, and on term papers, to which the determination to get into medical school can lead.

The majority of medical students are still male, white, and upper middle class. Of the 1975-76 medical school applicants, 11-12% were children of physicians; 46-47% reported fathers' occupations that could be classified in the categories of "other profession," or "owner, manager, administrator (non-farm)"; 50% of the applicants' fathers had earned at least a baccalaureate degree, and 32% had completed graduate or professional training. The median parental income was $18,400.

At the same time, it is also true that the number and proportion of women and minority group members applying to and being admitted to medical school has been increasing. In 1975-76, 22.6% of applicants were women, and a survey of medical school deans projected that by 1985, 30% of all medical students would be women. Of the total applicant pool, 14% or 5,903 candidates described themselves as belonging to ethnic or racial minorities. In the past year, there has been a slight decline in the number of applicants to medical schools from minority groups, but their acceptance rate has remained above average. This fact, combined with the well-known efforts that medical schools have been making to recruit minority students and the intense general competition to gain entrance to medical school already discussed, has contributed to the "reverse discrimination," Bakke case-type allegations and questions now pending before the U.S. Supreme Court.

It remains to be seen what impact the greater number of women and minority students will have on the attitudes, values and behavior patterns that students bring to medical training; on the social system of the medical school, its ambience and ethos; on the intellectual, technical and psychosocial learning that medical students undergo; on the fields of medicine they choose; and on the milieux and styles in which they practice. But there is every sociological reason to suppose that their presence in the medical school and in the medical profession will make a significant difference. For example, there is already some observational evidence to suggest that having more women in medical school has helped to make faculty and students more conscious of how often graduate physicians and student-physicians respond with bravado-infused, counter-phobic humor to stresses associated with examining and cutting into the human body, probing the human psyche, birth, sexuality, and death. The macho, front-lines-of-the-battlefield quality of these responses has become more apparent to them, eliciting questions about the desirability and inevitability of such "masculine" coping mechanisms. There are also statistical data that point to the fact that there is an increasing tendency for "new" women medical students seriously to consider careers in fields that have been especially dominated by male physicians, such as obstetrics and gynecology, and surgery, as well as those areas of medicine that women have traditionally selected, such as pediatrics, psychiatry, and internal medicine.

Although the social backgrounds of present-day medical students are not startlingly different from those of their predecessors, the process of deciding whether or not to apply to medical school and become a physician that they have undergone contrasts sharply, in many cases, with the decision-making style and timing that was characteristic of medical students in the 1950s. There appear to have been fewer "I have always wanted to be a doctor" types in the 1970s than in the 1950s, and more medical students who might be termed late-deciders. A reported increase in the mean age of 1975-

76 medical school applicants to 24.1 years gives some substantiation to this impression. It is not uncommon for the "new" medical student to have committed himself or herself to becoming a physician in the last two years of college, or after graduation from college, and to have done so in a questing, doubt-accompanied way, after having considered and in some cases tried out a number of alternative possibilities. Even after having finally opted for medicine and succeeded in being accepted by a medical school, the new student may continue to raise questions about whether or not medicine is really his or her vocation. To my knowledge, there is only one study to date that has attempted to examine the relationship between late versus early deciding and the attitudes, values, and sentiments of medical students. In his Ph.D. dissertation, *The Freshman Medical School Experience,*[5] Dr. Steven Korner has explored these characteristics of a recent first-year (University of Pennsylvania) medical school class. He discovered that the late-deciders in the class were not only somewhat older than early-deciders, but they were also more likely to have seriously considered non-medical careers and to have taken non-medical undergraduate majors in the humanities or the social sciences. Furthermore, they were not as prone to express interest in medicine because it is a highly respected profession, and were more inclined to question established institutions inside and outside of medicine than their early-decider classmates. They were also more self-critical as well as being critical of others, and their attitudes towards religion, marriage, and the family tended to be less traditional.

The newness or non-newness of today's medical students cannot be evaluated without reference to how much the medical school curriculum through which they pass has or has not been altered since the 1950s. Medical educators themselves have been half-proudly and half-ruefully inclined to describe the curriculum as very different from its pre-sixties antecedent, and in fact, it does seem to have undergone some notable changes. It is less of a lock-step curriculum than it was in the past, with more elective and free time, and multiple tracks, that make it possible for students to proceed through medical school in a number of alternatively patterned ways. Combined M.D.-Ph.D. programs have been created. The course of studies is no longer sharply dichotomized into pre-clinical and clinical years. Rather, a required core curriculum has been instituted in many medical schools, in order better to integrate the various basic sciences with each other and with clinical medicine. Some fields of training are now open to students that did not exist in the same form in the fifties, such as community medicine and family medicine. In keeping with the evolution that has taken place in the biological grounding of medicine, students receive much more education in molecular biology and somewhat less in gross anatomy than in the past. An impressive number of courses and even programs in medical ethics have been introduced in medical schools since the mid-1960s, a development that is both a concomitant and a consequence of the larger bioethics movement that has emerged on the American scene.[6] By and large, the amount and range of scientific knowledge and technical skills that students are asked to acquire in the course of medical school has greatly increased, magnifying still further the "there is too much to learn" problems by which medical students so often felt overwhelmed in the 1950s.

On the other hand, although virtuous affirmations are constantly made by medical educators about the relevance of behavioral science training to physicians' learned abilities to help improve the overall organization and delivery of medical care in the society, as well as to take care of their own

patients with humane competence, behavioral science is in most medical schools no more an accepted or integrated part of the curriculum than it was twenty-five years ago. It is also impressive to note that the medical school events that present-day students experience as major rites of passage, initiating them into physicianhood, are the same as those that were singled out by students of past generations. The dissection of the cadaver in the anatomy laboratory, participation in a first autopsy, the first birth and the first death experienced in the role of physician-to-be, the first venipuncture, and the first pelvic examination that a student is called upon to do — perhaps these are among the most immutably symbolic and powerful aspects of the socialization process that students undergo, no matter what the surrounding social and historical circumstances may be, because they are so deeply connected with fundamental human condition dimensions of health, illness, and medicine, and with the distinctive responsibilities and privileges of doctorhood.

Student attitudes towards the medical school curriculum have probably changed more than the curriculum itself. Students of the 1960s and 1970s are more outspoken about what they consider to be the essential conflict between the all-consuming, often exhausting demands that medical training makes on them and the high value that they place on their personal development, their humanity, and their life outside of medicine. They are not only concerned about the extent to which the relentless requirements of medical school may be a dress rehearsal for the "on call twenty-four hours a day" claims of their chosen profession. They are more diffusely apprehensive about what they consider to be the silent power of the "white coat socialization"[7] process that they undergo in medical school. This is a process to which many students attribute the insidious capacity to mold their attitudes, behavior and style of life, so that rather than fulfilling their aspirations to become different, better, more sensitive, whole and more socially responsible physicians than their predecessors, they will be transformed into physicians who replicate them. In these regards, what is new about medical students is their tendency to view their teachers and professional forebears as negative rather than positive role models, their high socialization consciousness, their sense of how forceful the medical socialization process is, and their conviction about their own pliancy in the face of it, despite their resolve to be steadfast.

In the 1960s, the appearance of students in the classroom, auditorium, laboratory, clinic, ward, and hospital room settings of their medical school training dressed in blue jeans and open-necked sport shirts or blouses, wearing their hair long, and, in the case of some male students, with mustaches and beards, was a very new phenomenon that evoked complex responses from their patients as well as their teachers. By the 1970s, this once anti-establishment, anti-bourgeois, and pro-social-change student garb had become less startling and more conventional and had lost a great deal of its original symbolic significance. But some of the values with which this self-presentation was associated, and the conceptions of a "good physician" that accompanied it, are still present in the "new" medical student subculture today. Health and health care continue to be viewed by many students as fundamental rights that ought to be distributed as equitably as possible. They are especially concerned with the extension of these and other rights to those persons in the society who are disadvantaged or vulnerable. Their vision of the ideal physician is staunchly egalitarian. For them, hubris-infused, professionally dominant behavior is the antithesis of the unpretentious, collegial, non-authoritarian,

honest, open and non-manipulative way that physicians ought to relate to patients, to each other, and to the non-physician members of the medical team. As they see it, the hierarchical dimension in professional as in personal relations should be reduced as much as possible. Students also attach great importance to the capacity to feel, to be sensitive, concerned, empathic, humane, and compassionate. The physician who is endowed with these qualities and who expresses and conveys them, students believe, is not only a better, more complete human being; he or she is a physician who is more capable of practicing the kind of humanistic medicine that dignifies and heals patients. Students are less enthusiastic and more skeptical about the value of objectivity or the supposed necessity of detachment in the outlook and comportment of the physician. In fact, one of the aspects of the "white coat socialization" process that they most fear is its potential ability to transmute them into professionally aloof physicians who have lost a great deal of their once spontaneous ability to respond and to act with sensibility and feeling.

Students' own testimony about what drew them to medicine and what impels them to be physicians is difficult to evaluate. Medical students of the seventies, even more than those of the sixties, are vocal advocates of what they call *authenticity*. For them, this quality and outlook include the espousal and practice of a highly structured kind of self-criticism. In their system of values and norms, the authentic medical student is one who knows and freely admits that non-idealistic factors, such as interest in prestige, status, a high income, security, authority, power, and the like, are among the primary features of medicine and physicianhood that attract and bind him or her to the profession. There is a compulsive, ritualistic, and in some cases confessional quality to the way in which students speak of their involvement in medicine. But they appear to have a more difficult time admitting that more disinterested, scientific, humanitarian, therapeutic, or reformist motives may also be among their major reasons for wanting to be physicians. They are self-searchingly skeptical about how genuine such affirmations on their part could be. It is almost as if the "new" medical student believed that authenticity precludes the avowal of motives that sound too admirable.

Perhaps, above all, it is the questioning, doubting, wondering, critical, and self-critical way in which many medical students of the 1960s and the 1970s relate to medicine that distinguishes them from physicians in the old mold. As Dr. Fitzhugh Mullan has put it:

> During most of the sixties, and part of the seventies, I assumed that I was part of a revolution....I anticipated that some sort of new order was being established in society in general, and the I specifically was involved in the retooling of medicine.... Now I find myself asking what happened? My simple assumptions of the past years have not held up well in the mid-seventies....I am left wondering, what really happened? Was there a revolution? What was accomplished? Was I a revolutionary? And toughest, who am I now?...[8]

Historically and sociologically, it is still too soon to answer Dr. Mullan's questions.

NOTES AND REFERENCES

1. Horowitz, Steve, and Offen, Neil. *Calling Dr. Horowitz.* New York: William Morrow & Co., 1977.

2. Mullan, Fitzhugh. *White Coat, Clenched Fist.* New York: Macmillan, 1976.

3. I have identified some of these studies and presented an analytic overview of their major findings in Renée C. Fox: Is There a 'New' Medical Student? A Comparative View of Medical Socialization in the 1950's and the 1970's, *in* Laurence R. Tancredi, ed., *Ethics of Health Care,* Washington, D. C.: National Academy of Sciences, 1974, pp. 197-227.

4. The greater part of the statistical data presented in this section come from Travis L. Gordon and Davis G. Johnson: Study of U.S. medical school applicants. *J. Med. Ed.* 52(9):707-730, September 1977.

5. Korner, Steven. *The Freshman Medical School Experience: Early vs. Late Deciders.* A Disserta-

tion in Education with Specialization in Counseling Psychiatry, presented to the Faculty of the Graduate School of Arts and Sciences of the University of Pennsylvania, in partial fulfillment of the requirements for the degree of Doctor of Philosophy, 1977.

6. For a descriptive account and sociological interpretation of the development of bioethics in American medicine and society, see Renée C. Fox: Ethical and existential developments in contemporaneous American medicine: Their implications for culture and society. *Milbank Mem. Fund Q. Health and Society:* 445-483, Fall 1974.

7. Mullan, *op. cit.*

8. Mullan, *op. cit.,* pp. 215, 222.

Is There A New Medical Student?*

By SAMUEL O. THIER, M.D.†

Answering the question of whether there is a "new" medical student presents a problem in perspective. Imagine, if you will, sitting on a stopped railroad train in a station while a train headed in the opposite direction is stopped alongside of you. When the other train begins to move, you experience the sensation that you are in motion, and that sensation will be corrected only after a finite period of time. The misjudgment that you were moving resulted from a shifting frame of reference. To avoid similar misperceptions in trying to answer the question of whether we have a new or different medical student, we must answer the question, "different compared to what?" One frame of reference would be earlier medical students. The difference between the medical students of today and those of ten, twenty, or fifty years ago is certainly one valid comparison. Another equally valid comparison is between changes in medical students and changes in the social and professional setting in which the students are educated. The question is not simply whether the medical student has changed over the past few decades, but whether the student has resisted change compared to society as a whole, has changed in parallel with or in advance of social change. Finally, it is worth noting that the people assessing the medical students are subjective viewers and may have changed their perspective as well. With that preamble and an apology for what may be a lack of precision in answering the question at hand, let me proceed to answer "no."

First, let us take a purely quantitative view of the differences in medical students over the past few decades. There are now twice as many medical students as there were twenty years ago. There are more applicants to medical school, filing more applications per student, and the acceptance rate is down. These facts need reflect nothing more than the stability of the medical profession as far as status, career satisfaction, and income are concerned, in comparison to most other scientific fields. During the last twenty years a lack of long-term planning for national needs in fields such as engineering, chemistry, physics, and mathematics led to the training of excessive numbers of Ph.D. candidates. When the candidates exceeded the opportunities available to them, instability of careers, increased competition for positions, and even loss of jobs occurred in these disciplines. It is hardly surprising, if other scientific endeavors were unstable and medicine stable, that bright students have opted for careers in medicine. Thus, the increasing number of medical school applicants may reflect nothing more than the expected response to societal forces.

Second, let us examine the genesis of the medical students. For the last half-century medical students have come from the higher socio-economic classes of this country. There has been minor variation over the past decade or two but on the whole very little change. If anything, the slight increase in applicants from lower socio-economic classes observed in the early part of this past decade is being reversed by the increasing costs of medical education. The geographic origins of the students have also changed very little. On the assumption that students from more rural

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settings would return to those locales to practice, medical schools attempted to accept more students from rural areas. The evidence that these students are, in fact, returning in significant numbers to their geographic origins is very flimsy at present. Viewed in long-term perspective, it is hard to see that the medical student of today is drawn from a different socio-economic or geographic background than the medical student of two decades ago.

Third, let us examine the scholastic performances of the applicants. The grade point average of the entering medical student has, in fact, gone up significantly in the past ten to twenty years. However, the grade point averages of college students in general have gone up over the same time. There is not much reason to believe that we are seeing anything more than an inflation of the grade point average. The medical college admissions test (MCAT) is standardized to make it possible to compare grades from year to year and over a period of years, and there has been a gradual increase in the MCAT scores of entering medical students. Unfortunately, however, while the science scores have risen during the past decade, the performances on the general information tests have gone down. If you agree, as I do, with Dr. Gerald Klatskin of Yale University, that our minds are a lot like valises, which fill up and can only have more information added by throwing something else out, you might interpret the rise in science scores as being at the expense of the attainment of general knowledge, a circumstance explicable on the basis of the highly competitive undergraduate premedical programs but not necessarily indicative of a new and different medical student. We certainly have no evidence that today's medical students have a broad, liberal educational background, which medical educators define as desirable.

Since the quantitative statistical approach to differentiating today's medical student from those of preceeding decades offered very little evidence of "newness," I thought I might be more of a biomedical scientist and analyze the composite medical student on the basis of: 1. Genotype. The major genetic change is that the "average" medical student in 1927 had approximately 1.05 X chromosomes, while today's medical student has 1.25. The genotype shows a small but significant difference. 2. Phenotype. Examination of the phenotype indicates that over the past fifty years the "average" medical student has taken on more female characteristics and has skin which is 5 percent darker. There has been no significant change in the age of the average medical student. Thus, the personal characteristics of today's medical student are somewhat different from the student of the 1920s. There are many more women and a few more minority students, but comparing changes not only between groups of students but also to changes in society, it is clear that the medical students have resisted change very effectively when compared to the rest of society.

If statistical and biological analysis of medical students did not demonstrate any major changes over a period of fifty years, perhaps the place to look for a real difference in the medical student of today is in behavior and attitudes. It is in the area of behavior that I was nearly convinced that there was a new medical student. In the late sixties and early seventies, a time of admitted unrest on campuses of this country, the medical students not only went along with the general air of protest, but initiated some real changes in social structure of the medical school. A hierarchical teacher-student relationship was modified, I believe for the better, to one of a more collegial relationship, where the medical students were a responsible and integral part of the process of medical education. In

initiating these changes, the students educated the faculty and changed the views of faculty members, I hope, irreversibly. Unfortunately, students have retreated from a position of leadership for change, and today's medical schools, like the rest of today's campuses, are again becoming quieter and more conservative. The less visible changes in attitude or behavior among medical students, discussed by Dr. Fox, cannot be accepted as reflecting changes indicative of a new medical student. Unfortunately, the techniques by which attitudes are determined and quantified leave an enormous amount to be desired. Thus, the data upon which putative changes in attitude are based are soft and cannot be the firm foundation for an argument that there is a new medical student.

If there are no changes of note in the type of applicant or in the social or geographic origins of the applicant, and if the sex and race differences of today's medical students represent changes which are slower than changes in other areas of society, and if attitudinal changes are difficult to document, then it is very difficult to argue that we have a new medical student today. And yet, it might be equally hard to argue that the medical student of today is the same in terms of educational background and expectations as the medical student of twenty-five or fifty years ago. The real question is whether the differences that exist in today's medical student are significant, not simply when measured against the student of fifty years ago, but when measured against the changing scene of medicine and society.

During the past three of four decades we have seen the growth of specialization in this country as a natural outgrowth of increasing sophistication of knowledge and technology. To have resisted specialization as a concept in view of the explosion of medical knowledge would have been irrational. Postgraduate medical training became more specialized, and students followed by electing specialization earlier in their careers.

The advance of specialization and the changes in postgraduate medical training were then enhanced by the era of NIH funding, which led to the development of a large cadre of biomedical researchers in this country. The feeling that science and technology would answer many of the perplexing questions facing this nation was relatively prevalent in the post-World War II period. Though it is now evident that far too much was expected of science, it must be conceded that medicine did about as well as any science in fulfilling the promise of improving the condition of the population. During the era of liberal NIH funding, more medical students considered academic careers, again simply following the general trend.

When it became clear in the 1960s that science and technology alone would not answer the medical problems of this country, we entered an era in which there was an increasing cry for relevance of medical education. Relevance of knowledge meant knowledge which was immediately applicable to patient care. The bankruptcy of the "immediate relevance" approach as a means of perpetuating the advance of medicine frequently was simply ignored. The expansion of medical school classes, the introduction of programs in community medicine, and the shift toward greater support of applied versus basic research were the result of this period of turmoil. Since modifying undergraduate medical education is likely to have little effect on medical practice, and since changes in postgraduate educational programs which might have changed practice were not impressive, medical practice and students changed little.

It is hardly suprising, after these periods of differing pressures and varying support, that this nation lacks both a well-defined health

delivery system and clear goals for biomedical research. Biomedical research decisions are as much influenced by special interest groups as by reasoned examination of opportunities and goals. The response to this confusion and frustration has been our entry into a period of what may be excessive regulation. The Government has been tampering with the regulation of virtually everything from the performance of laboratory tests to medical school admission criteria. This thrust toward regulation has occurred with the same lack of overall goals as characterized the past two to three decades of medicine in this country. Against this background, the medical student today shows one significant change from the student of a decade ago. For the first time in my brief career of counseling students and house officers, there is an uncertainty about the future and a grasping for security.

Viewed against the chaotic changes in American medicine and in society over the last twenty-five to fifty years, the very modest differences in the medical student of today compared to the medical student of fifty years ago are, in my mind, evidence that there is not a new medical student, but that there is a very much the old medical student, modified by a Darwinian selection process but much closer in origins and temperament to his or her predecessors than most other groups in society today.

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The Rhythm Of Life Among The Hudson Valley Dutch In the Eighteenth Century

By ALICE P. KENNEY*

The history of medicine is now understood to include the promotion of health as well as the conquest of disease, the enhancement of life as well as the outwitting of death. The history of women includes not only the extraordinary achievements of the few, but the everyday activities of the many, which for the vast majority of women in all times have centered around the medical events of birth, childbearing and death. Historical demography, which studies the records of these events to discover how patterns of fertility and mortality in populations of the past differed from those of the present, therefore offers many insights to both historians of medicine and historians of the experience of women. This paper illustrates some of the ways in which demographic methods can illuminate the rhythm of life among women of Dutch descent in the upper Hudson Valley in the eighteenth century. It is based upon analysis of the registers of baptisms, marriages and burials of Dutch Reformed churches in the city of Albany, the town of Schenectady, and six nearby rural communities.

The settlement later called Albany was founded by the Dutch in 1624 as a fur-trading post at the head of navigation of the Hudson River and remained one of the principal towns of New Netherland until its conquest by the English in 1664; in 1686 Governor Thomas Dongan granted Albany a city charter. Schenectady, fifteen miles to the west on the Mohawk River, was founded in 1661 as a competing fur-trading post; destroyed by a French and Indian attack in 1690, it was soon rebuilt. After the war which followed, farmers began to spread out over the fertile land surrounding these towns, growing golden wheat which the merchants of Albany shipped to the West Indies, where it was exchanged for sugar as part of the "triangular trade" with England. The French and Indian War brought many sudden changes, as a British army larger than the civilian population of the entire region made Albany its base for the conquest of Canada. A generation later, during the American Revolution, the people had to endure Burgoyne's invasion, Tory and Indian raids, and perhaps most difficult, seven years of siege when the British occupation of New York City cut off their commerce with the outside world. After the Revolution, the region prospered and its way of life changed as Albany became the "western gateway" of the water-level route to the Great Lakes, and the capital of the state of New York.

The population of this region increased rapidly as its economy throve. The first recorded census of 1689, 65 years after the first settlement and 25 years after the English conquest, reported about 2,000 people in Albany County, which included all the settled areas north of Kingston. During the Indian war of the next decade, destruction and flight reduced this population by one-fourth, to about 1,400 in 1698. After the peace, however, it recovered quickly and continued to grow to about 17,000 in 1756, of whom perhaps 3,000 lived in the city of Albany and the remainder in Schenectady and on farms in the outlying districts. Most of them were descendants of

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the seventeenth-century colonists from the Netherlands, or a few French and German refugees from religious persecution, and about 10% black slaves; most of the occasional English immigrants married Dutch girls and fitted into the Dutch social structure. The French and Indian War brought large numbers of British veterans and Scots and Scotch-Irish settlers to newly-opened frontier lands, raising the population of the county to 43,000 in 1771. After the Revolution, land-hungry young couples from New England flooded westward, until there were 72,000 people in the county in 1790, just before it was subdivided. In this population explosion the Dutch, though increasing in numbers, quickly became a minority whose cultural tradition no longer shaped the social structure of the community.

Wherever these descendants of the Netherlands settled, they continued to speak their dialect of the Dutch language and organized Dutch Reformed churches, which by the colony's legal code of 1683 were required, as were churches in England, to keep registers of baptisms and marriages as public records of vital statistics. For the church at Albany, complete registers of baptisms and marriages have survived from 1683 to 1809, when the congregation split. Early records from Schenectady were destroyed in the massacre of 1690 or lapsed when there was no minister, but the registers are nearly complete from 1730 to the end of the century. Churches were founded about 1730 in the rural communities of Claverack, Kinderhook, Catskill and Coxsackie, but they too often lacked ministers; their registers become continuous about 1750. Schagticoke enters the picture in the 1760s and Schodack after the Revolution. Since under these circumstances people often had to go to neighboring churches for these ceremonies, and might be married in one church while their children were baptized in another — or others — it is essential to study all of these congregations as a group. Burial registers, kept in churches in England as part of the public records, were much less carefully kept throughout the American colonies. Here, they are available only for the city of Albany from 1722 to 1765, and even then do not include the large number of people who were buried in family plots on their farms rather than in the churchyard.

Study of these registers by "aggregation," counting the entries, reveals a total of 6,539 marriages and 34,496 baptisms, though it should be pointed out at once that many couples married and moved away before they completed their families, and many of the parents of children baptized had been married elsewhere. The Albany register recorded 2,729 marriages and 12,931 baptisms; 1,579 marriages and 8,390 baptisms took place in Schenectady, and 2,029 marriages and 13,175 baptisms in the other parishes. It will be noted in Table 1 that the number of both baptisms and marriages doubled and redoubled for each successive quarter-century of the period under study. In the first fifty years, most of these events were recorded in Albany and the rest in Schenectady, but in the second quarter of the eighteenth century one-fourth of both baptisms and marriages were performed in the rural parishes, and by the end of the century this proportion had risen to one-half. The fragmentary Albany burial registar lists 2,020 deaths over 43 years, indicating two major epidemics, one in the winter of 1731-32 which swept away many children, and the other in the summer of 1746 (known from other sources to be yellow fever) which struck down mostly adults.

To see patterns in the sequence of these events over the entire period, it is better to look at five-year averages than annual totals. The sharp decrease in the population of the region during the Indian wars of the 1690s does not show up in the averages because the

Table 1

AGGREGATION SUMMARY, ALL PARISHES, 1683-1800

Years	Totals		Averages		Fertility rate
	Baptisms	Marriages	Baptisms	Marriages	
1676-80	----	----	----	----	----
1681-85	148	18	29.6	3.6	----
1686-90	335	63	67.0	12.6	8.54
1691-95	399	79	79.8	15.8	6.74
1696-1700	484	100	96.8	20	5.80
1676-1700	1,366	260	54.64	10.4	
1701-05	535	95	107.0	19.0	5.90
1706-10	537	66	107.4	13.2	6.31
1711-15	449	72	89.8	14.4	6.26
1716-20	580	198	116.0	21.6	6.29
1721-25	569	132	113.8	26.4	6.39
1701-25	2,670	473	106.8	18.9	
1726-30	781	144	156.2	28.8	5.62
1731-35	986	201	97.2	40.2	5.97
1736-40	952	145	190.4	29.0	5.89
1741-45	994	181	198.8	36.2	6.46
1746-50	1,023	132	204.6	26.4	7.20
1726-50	4,737	803	179.5	32.1	
1751-55	1,247	188	249.4	37.6	7.03
1756-60	1,388	264	277.6	52.8	6.71
1761-65	1,722	398	344.4	79.6	7.01
1766-70	2,235	252	447	50.4	7.71
1771-75	2,370	331	475.2	66.2	7.57
1751-75	8,968	1,433	358.7	57.3	
1776-80	3,266	498	653.2	99.6	7.17
1781-85	3,318	639	663.6	127.8	5.80
1786-90	3,368	810	673.6	162.0	4.91
1791-95	3,261	799	652.2	159.8	4.03
1796-1800	3,542	824	708.4	164.8	3.32
1776-1800	16,955	3,570	670.2	142.8	
	34,496	6,539			

registers for the preceding years are incomplete. But there is a conspicuous dip in the averages of marriage for 1706-15, when the children of the 1690s would have been reaching the age of marriage, and a corresponding dip in the average of baptisms for 1711-15, when they would have been starting their families. Similar dips in the average of marriages in 1736-40 and 1766-70 could show this population "pinch" recurring in successive generations, although as these families were increasingly outnumbered by more recent immigrants this factor would have been of less importance. The low average of 1746-50 in all probability reflects the yellow fever epidemic of 1746, as well as a gap in the registers between two ministers. Later averages of baptisms, except perhaps that for 1736-40, do not show a similar "pinch," probably because of immigration of young parents married elsewhere. A pilot study of a few representative Dutch families does reveal a possible "wave" pattern in baptisms as well as marriages until after the Revolution, when increasing mobility makes all "aggregated" statistics suspect. Figure 1 shows the more precise picture offered by nine-year moving averages, which tabulate annually statistics calculated over an entire decade. These also indicate slight dips in marriages in the years when successive generations descended from the small group born in the 1690s would have reached maturity, but show no corresponding interruptions in the steady increase in numbers of baptisms.

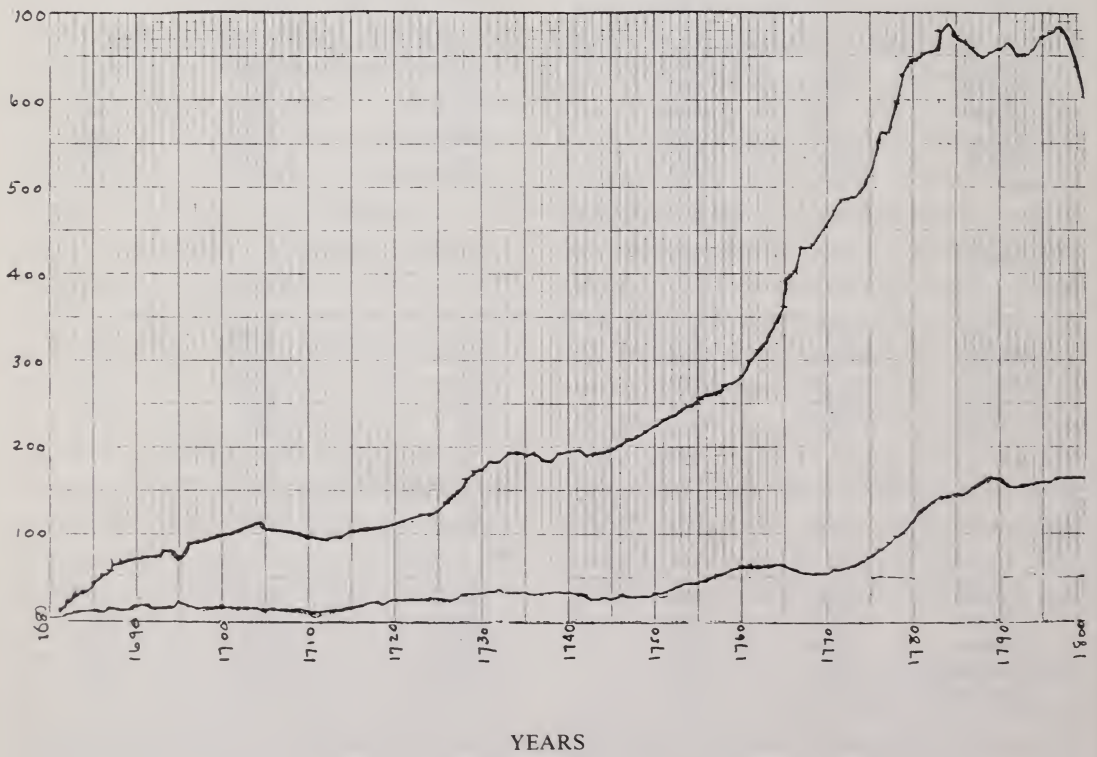

Fig. 1. Nine-year moving averages, marriages and baptisms

When baptisms and marriages are averaged against each other, by a complicated process which divides the marriages of a fifteen-year period into the baptisms of an overlapping fifteen-year period when most of the children of the couples would have been born, the fertility rate for the entire period proves to be about six children per marriage. Although this figure is somewhat suspect because so many parents were married elsewhere, many Dutch families were in fact very large — six to a dozen children — and more detailed analysis will probably show this figure to be not far from the mark. This rate cannot be applied to the population as a whole, since the Dutch Reformed churches served primarily their own ethnic group, but it is consistent with the ratio of 30-50 births per 1,000 which has been estimated for the American colonies as a whole. It is interesting to note that the corresponding rate for Albany alone falls steadily throughout the century, from about six to about three children per marriage, while those for outlying parishes show many statistical absurdities arising from the surplus of baptisms over marriages, clearly reflecting the fact that couples were often married in Albany when there was no minister in their home church. Further study will be required to determine to what extent the decline in the total fertility rate after the Revolution reflects increasing mobility and to what extent smaller families.

Such "aggregated" statistics are, of course, only the beginning of the information that can be recovered from these registers. Another procedure, "family reconstitution," brings together all the events concerning a single couple — the dates of baptisms, marriage and burial of both spouses, and similar data for their children. From these dates may be calculated the age of husband and wife at first marriage, which preliminary figures for a pilot group of families indicates to be 26-30 for bridegrooms and 21-30 for brides. It shows the number of children per family — often six or eight and sometimes as many as thirteen — and the interval between them, which was almost universally about two years. This suggests that the Dutch probably did not practice artificial birth control, but that mothers customarily nursed their infants until they were about a year old. For the last thirty years of the eighteenth century, when the Albany register gives the dates of both birth and baptism, the majority of children were christened at between two and six weeks old; further study may reveal whether those baptized sooner were in greater danger of death. The registers rarely record baptisms of illegitimate children or baptisms or marriages of black slaves, suggesting that Dutch religious beliefs tended to exclude these groups. A considerable number of Indian converts and their children, however, were baptized immediately before and after the turn of the eighteenth century. There was apparently little or no stigma attached to premarital pregnancy of betrothed women, for throughout the period approximately one-third of the first babies of the pilot group were baptized less than eight months after their parents' marriage — an interesting contrast to some New England studies which show no such baptisms in the seventeenth century, but a rise to one half in the mid-eighteenth century.

When the fragmentary burial registers are supplemented by dates of death drawn from probate records, genealogies and other sources, it will be possible to calculate the length of women's periods of fertility, the length of marriages and of widowhood, and longevity. Considerable numbers of both men and women attained very great ages, surviving well into their eighties. Infant mortality can be calculated to some extent from the Dutch practice of naming children for their grandparents and other relatives, and repeating the name if the child died. In

some families this happened fairly often, and in others all or nearly all of broods of eight or ten children grew up to have families of their own, repeating the names of their parents in a manner most confusing to historians. Some children grew to adulthood and never married, but this condition was relatively rare, particularly in the early years of the colony when women were less numerous than men.

When the study of these registers is extended beyong pure statistics to genealogy, patterns of intermarriage and community social structure begin to emerge. A pilot study of ten leading merchant families in Albany, for example, shows that although they were not related to each other in the beginning, their children and grandchildren intermarried in up to 50% of all marriages in the second quarter of the eighteenth century. A similar pattern of intermarriage is consistently visible, not within the same family or between two families, but within loosely-knit complexes of five to ten families, which often lived near each other or followed the same trade. To see it in its full extent, it is necessary to look at the region as a whole, for the Dutch used the Hudson River as a highway for boats in the summer and sleighs in the winter, and thought little of travelling twenty or thirty miles to visit relatives or friends. These family complexes reappear in many aspects of Hudson Valley history, particularly politics and commerce, as well as social and family affairs, and resemble similar groups of intermarried families, called *patricians* by historians, who ruled the cities of the Netherlands for generations, taking in new blood and new wealth by marriage.

Statistics, however, are significant only as they add a dimension to our understanding of the lives of real people who often left little or no other record of themselves. Family reconstitution brings to life men — and especially women — of many social levels, excluding only those too poor or too indifferent to care about participating in the religious side of community life. As Robert V. Wells has observed, demographic evidence not only reveals patterns of human behavior, but points to the values underlying the decisions which prompted this behavior. The people behind these statistics appear as healthy, hard-working men and women who married in early adulthood, produced at reasonable intervals large broods of healthy children, and brought them up to help grow the abundant crops that kept them all well-nourished. These children in turn grew up to marry young people like themselves and establish similar farms and similar families in the neighborhood. Most of them lived long and productive lives, after which they were buried in family plots on their own farms, thus remaining to the end a part of the land that nurtured and sustained them. Their rhythm of life reveals an interaction between human choice and the inevitable course of natural events consonant with the rhythm of the seasons and the years, which clearly promoted personal and family well-being. Their example may well indicate some worthwhile directions for the pursuits of health in our own time.

NOTES ON SOURCES

1. Historical demography is a wide-range subject which has been of interest to scholars of many nations and periods; an overview is offered by T. H. Hollingworth, *Historical Demography* (Ithaca, N.Y., 1970).

2. The method used in this project is based on that described in E. A. Wrigley and Peter Laslett, eds., Introduction to English Historical Demography (New York, 1966).

3. Most works on American historical demography concern New England; some of the best-known are Philip Greven, *Four Generations* (Ithaca, N.Y., 1970); John Demos, *A Little Commonwealth,* (Oxford. 1970); and Kenneth Lockridge, *A New England Town* (New York 1970).

4. The only book so far which touches upon colonial New York is Robert V. Wells, *The Population of the British Colonies in America Before 1776* (Princeton, N.J., 1975); a valuable attempt to establish an overall structure for the work which has been done is Robert V. Wells, Family History and Demographic Transition, *Journal of Social History,* Sept. 1975.

5. A pilot study of the present project appeared in Alice P. Kenney, Patricians and Plebeians in Colonial Albany, *de Halve Maen* 5 parts, Apr. 1970-Apr. 1971. For further background on the way of life of the Hudson Valley Dutch, see Alice P. Kenney, *The Gansevoorts of Albany* (Syracuse, 1969) and *Stubborn for Liberty: The Dutch in New York* (Syracuse, 1975).

6. The Albany registers of baptisms and marriages, 1683-1809, were published in the Holland Society of New York, *Year Book* (1904-08, 1922-27); the burial registers, 1664-1883, are in the Dutch Settlers Society of Albany, *Yearbook* (1932-34, 1963-64).

7. Baptism and marriage registers for Claverack, Coxsackie and Schagticoke have been published in the *New York Genealogical and Biographical Record* as follows: Schagticoke marriages, 1750-1868, Oct. 1928-Jan. 1929; baptisms, 1752-1866, Apr. 1929-July 1934. Claverack baptisms, 1748-1800, Jan. 1943-Jan. 1945, and Apr. 1950-Oct. 1952; marriages, 1727-1822, Jan.-Apr. 1957 and Jan.-Apr. 1958. Coxsackie baptisms, 1760-90, July 1957-Oct. 1958.

8. Schenectady marriages, 1691-1720, are published in *New England Historical and Genealogical Register,* Vol. 21, and 1691-1768, in *New York Genealogical and Biographical Record,* Jan.-Apr. 1942. Schenectady marriages, 1768-1850, and Schenectady baptisms, 1730-1800, are available in manuscript at the New York State Library, Albany, New York.

9. Registers of Catskill marriages and baptisms, 1732-1833, Kinderhook marriages and baptisms, 1712-1848, and Schodack marriages and baptisms, 1770-1847, transcribed by Royden Vosburgh, are available on microfilm from the New York Genealogical and Biographical Society.

A Discussion of Professor Alice P. Kenney's Paper, "The Rhythm of Life Among the Hudson Valley Dutch in the Eighteenth Century"

By LOUIS A. MEIER, M.D., C.M., FACS*

Church records are a great source of information, particularly if registers of baptisms, marriages and burials, records of confirmations and communions, diaries, and account books are taken together. Some religious groups kept more complete records than others. As far as early American medical history is concerned, the Moravian Church Archives, for example, contain a wealth of information heretofore neglected by medical historians.

Dr. Kenney's analysis of registers of baptisms, marriages, and burials of Dutch Reformed churches in the city of Albany, the town of Schenectady, and six nearby rural communities is a worthwhile and needed study. It must be recognized, however, that demographic studies based entirely on church records must be interpreted with caution. As Dr. Kenney pointed out, aggregated statistics tend to become suspect as the mobility of the people increases. One must take into account social and economic conditions, patterns of migration, general population patterns, religious doctrines and practices, war and peace, and such simple and practical items as availability of a minister and willful or accidental destruction of records or any portion thereof.

Let me very briefly retrace some of the history of the Dutch Reformed in the Hudson Valley. The Dutch West India Company was granted a charter in 1621. In 1623 it brought the first thirty families of Dutch and Walloon (French) Protestants to America, declaring the Reformed religion established in their colonies and maintaining at their expense ministers, schoolmasters and sick-visitors. The Dutch Reformed among them settled in the Fort Orange (Albany) area, the French Protestants in the Camden, New Jersey, area. By agreement, as part of the takeover of the New Netherlands by the British in 1664, the Reformed Church retained its religious freedom. Even though Dutch immigration to the area nearly stopped and the Dutch intolerance of other religious groups was curtailed by the British, the Dutch Reformed Church remained strong. By 1687, Governor Dongan of the New Netherlands, in a report of the conditions in the colony, stated, "the most prevailing opinion is that of Dutch Calvinists. It is the endeavor of all persons here to bring up their children and servants in that opinion which themselves profess." While there was a notion among the general public that baptisms of slaves would *ipso facto* free them, King James nevertheless insisted that they be baptized. In the Dutch churches, according to the noted church historian William Warren Sweet, this seems to have been the practice.

Dr. Kenney found that the registers of the Dutch Reformed Church rarely record baptisms of illegitimate children, or baptisms or marriages of black slaves. I would like to ask Dr. Kenney whether these findings are based on published church records, and whether there are any pages missing from the original church records. At Augustus Lutheran Church in Trappe, Pennsylvania,

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for example, baptisms of illegitimate children seem not to be recorded either, but it was determined that pages were missing from the original register, having been removed by the descendants of the bastards, so to speak.

Dr. Kenney points out two other findings which interested me: the variations in age at time of baptism, and premarital sex as reflected by the fact that nearly one-third of first babies baptized were christened less than eight months after their parents' marriage. I do no believe that the latter can be explained by the premature birth rate among Dutch Reformed primiparous women in the eighteenth century in the Hudson Valley. Since mores and religion are so intertwined, I think it profitable to briefly look at the early history of the Reformed Church and Reformed doctrines before interpreting and attaching meaning to the baptisms at age six weeks versus those at age two weeks and to premarital pregnancies.

Reformers appeared on the scene long before Luther. The Moravians point out that the *Unitas Fratrum* had its origin in the reform movement of Jan Hus, who was burned at the stake in 1415. The early history of the Reformed Church has been termed "a drama in three acts." In act I the scene is Zurich (German Switzerland), and the leading character is Ulric Zwingli (1484-1531); in act II the scene is Geneva (French Switzerland), and the leading character is John Calvin (1509-1564); in act III the scene is Heidelberg (Palatinate), and the leading character is Frederick III, Elector of the Palatinate, also referred to as Frederick the Pious.

When Frederick III formally accepted the Reformed confessions in 1559, other princes followed his example, and the Reformed Movement stretched from the origin to the termination of the Rhine River. Frederick assigned the task of publishing a declaration of faith to Kaspar Olevianus (1536-87), a disciple of Calvin, and Zacharias Ursinus (1534-83). They prepared the catechism which was published in 1563 and became known as the "Heidelberg Catechism," the most generally accepted Reformed symbol. All early Reformers were disciples of Augustine. To them, sin was a question of relationship to God and of fundamental motivation. Calvin embraced the principle of predestination, which is prominent in the confessions of Holland where his influence was great. To understand Dutch Reformed religious practices, therefore, means to understand the "Heidelberg Catechism" and Calvinism.

The "Heidelberg Catechism" speaks of infant baptism as "a sign of the covenant.... as was done in the old covenant or testament by circumcision, instead of which baptism was instituted in the new covenant." Calvin thought it was wrong for private individuals to perform emergency baptisms. He also stated that "infants are not barred from the Kingdom of Heaven just because they happen to depart the present life before they have been immersed in water." There was no urgency to baptize infants. It cannot be inferred, therefore, that the Dutch Reformed children who were baptized at age two weeks were in greater danger of death than those baptized at age 6 weeks.

Dr. Kenney found the interval between children born into these families "was almost universally about two years." This cannot be attributed to the custom of the mothers nursing their infants until about age one year. Breast feeding prevents conception only for the first month or so after delivery. The nursing mothers then ovulate again even though they may not menstruate for months or even a year. The endometrium of nonmenstruating, ovulating, nursing mothers permits normal implantation of the fertilized ovum and survival of the implant.

Epidemics and their cause can often be determined by studying burial records and

evaluating numbers of deaths and the ages of the victims in terms of geographic areas and seasons of the year. Confirmatory information can then be sought in newspapers of that time, personal diaries, doctors' records, etc.

The premarital pregnancies in about one-third of the marriages appear to reflect the discrepancy between religious doctrines and religious practice among the Dutch colonists. Everardus Bogardus, the second Dutch minister in America, and his consistory noted that the Dutch colonists seemed "more likely to turn heathen than to turn others to the Christian faith." Reverend Megapolensis, who for six years served the Patroon of Rensselaerwyck, wrote in his treatise on the Mohawks, " 'Dutchmen run... very much' after the Indian women, who are 'exceedingly addicted to whoring.' " Under these circumstances, premarital sexual activities are not surprising. It seems that the young men married the girls they got pregnant in order to avoid the stigma of illegitimacy. Unfortunately, the Duke's Laws required the reading of the banns, which delayed marriages and made premarital pregnancies more apparent.

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In the Beginning(s)?
A Chapter in Antebellum American Ethnology*

By JAMES O. BREEDEN†

William S. Forwood, a young physician from Darlington, Maryland, wrote at the end of a May, 1857, article published in the *Medical and Surgical Reporter:* "It is our belief, and has been our purpose to show, that [the Negro] . . . is . . . entitled to the classification of a *distinct species.*"[1] With this assertion, Forwood touched off a heated debate that dominated the pages of this highly respected Philadelphia medical journal[2] for over a year. Far from being an isolated incident, this controversy was a microcosm of a larger struggle dividing America's scientists.

During the three decades immediately preceding the Civil War, the United States was the scene of a running dispute concerning the origin of the races, the reasons for the significance of racial differences, and the results of a juxtaposition of slavery with America's democratic, egalitarian, and Judeo-Christian principles. Antebellum America, at first glance, appears to have been an unlikely arena for such a dialogue, especially when one recalls that the science of anthropology was the product of eighteenth-century Europe and that its most important work was still being carried on there. With the important exception of the South, the resolution of this apparent paradox lies in the unique American circumstance of three vastly divergent ethnic groups — Caucasian, Negro, and Indian —living in close contact on the same continent. In the South, the debate was part of the region's campaign to establish the inferiority of the Negro.

Those scientists, North and South, who became caught up in this controversy were participants in what may have been the most significant development in American science during the first half of the nineteenth century. Foremost in importance, it gave rise to the American School of Ethnology, the first school of scientific racial anthropology. Chief among its membership, which included many of the nation's leading scientists, were Samuel G. Morton, who studied quantitative racial variations in cranial capacity and shape; E. George Squier, who established the antiquity of the American Indian; Louis Agassiz, who perfected the zoological concept of geographical distribution; Peter A. Browne, who called attention to the racial distinctions in hair shape and structure; George R. Gliddon, who used the latest archaeological discoveries from ancient Egypt to inform Americans of the existence of racial characteristics at an early historical age; and Josiah C. Nott, who investigated hybridity and became the leading popularizer of the group's findings.

Principal among these findings, impressively supported by the most important archaeological discoveries, were the antiquity of racial origins, the immutability of racial differences, and the persistence of racial types. In short, the major ethnic groups were distinct species which had been created individually in separate

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zoogeographical settings. This conclusion was hotly contested, especially by the nation's conservative scientists who were unable, or unwilling, to divorce natural science from the Bible. This group also included some of America's most prominent scientists: Asa Gray, John Bachman, James L. Cabell, and Moses A. Curtis, for example. Pointing to the Biblical story of creation and the similarity of men's bodies, they adamantly argued for the unity of the human species. Variety was the result of environmental factors (climate and state of society in particular), miraculous intervention, and accident.[3]

The furor triggered by Forwood's article is a highly instructive case study of the broader debate: it clearly shows the seemingly inevitable clash of scientific inquiry and established religion in such a volatile area of overlapping interest as the origin of man; it points up the era's growing specter of sectionalism and its permeation of all questions dealing with the place of the Negro in society; it demonstrates the impossibility, once the issues of religion and sectionalism had been injected, of either keeping such arguments in scientific and rational bounds or reaching a conclusion acceptable to either side; and finally, it reveals the range of participants and stands these controversies attracted and the tactics employed.[4]

The two most important figures in the *Medical and Surgical Reporter*'s ethnological debate were Forwood and Samuel W. Butler, the journal's editor and publisher. Forwood (1830-91) was a staunch supporter of the American School of Ethnology. Born into an old Maryland family, he received his early education locally and in Alabama, where the promise of cheap land had lured the elder Forwood during his son's youth.[5] Deciding upon a medical career, Forwood began his professional training under a preceptor in 1851. The next year he enrolled at the University of Pennsylvania, where he received his M.D. in 1854. He set up practice in his native Darlington, Maryland. A publicspirited and inquisitive individual, Forwood helped found and served as an officer in local medical and historical societies and published extensively on scientific and literary subjects. Although an avowed Southern sympathizer, he opposed secession, considering it "equivalent to suicide."[6] But once it had occurred, he vigorously defended the South's action and squarely placed the blame for the disruption of the Union on "the Abolition doctrines of the North."[7] He denounced Lincoln's attempts to restore the Union through force as a "wicked and most *ungodly* war" and urged Maryland to remain neutral.[8] It was his strident Southernism that convinced Forwood at an early age that "the negro occupies a subordinate position to the white man, which the Almightly designed he should," and that any attempt "to place the subordinate and inferior race upon an artificial equality with the master or superior race" was futile.[9]

Samuel W. Butler (1823-74) was, on the other hand, an unquestioning believer in the Biblical account of creation and the brotherhood of man. Like Forwood, his beliefs were strongly influenced by his background. Born in East Tennessee, where his physician father was a missionary to the Cherokees, Butler grew up among Indians and developed a lasting sympathy for the oppressed. He rejected early leanings toward a missionary's life for a medical career. After apprenticing under his father, Butler enrolled at the University of Pennsylvania and took his M.D. in 1850. He set up practice in nearby Burlington, New Jersey, but, owing to a penchant for literary pursuits and a natural writing talent, he soon gave it up to become assistant editor of the *New Jersey Medical Reporter* (the predecessor of the *Medical and Surgical Reporter)* which was published there. In 1854, he became its editor and

proprietor, a position he held until his death. The *Reporter* prospered under Butler's leadership, so much so that in 1858 he abandoned the provincial quiet of Burlington for Philadelphia, the medical capital of the nation. The journal was published here until its demise in 1878.[10] Professional recognition did not dampen Butler's orthodox Presbyterianism. At the same time, he never allowed his religious views to interfere with his editorial responsibilities, as shown in his decision to publish Forwood's ethnological observations.[11]

The piece was an animated argument for polygenism, as the position of the American School of Ethnology was called. Mustering support from the research of the leading polygenists, which ranged from the Negro's black skin and wooly hair to his reported smaller cranial capacity and alleged primitive psychological development, Forwood asserted that in every important respect — anatomically, physiologically, and intellectually — the black had always been, was, and would continue to be inferior to the Caucasian. He was, without doubt, a distinct species. Forwood dismissed the arguments of the unitarists, or those who advocated the unity of the human species, as either inconsistent with fact or unconvincing. Eager to build an impregnable case, he made three glaring overstatements, a tactical blunder which played a major role in causing the real issue, science and man's origin, to become sidetracked and the eventual stalemating of the debate. First, in claiming that "the capacious mantle of the church" afforded sanctity to errors concerning man's origin, he encouraged a theological controversy. Second, in asserting that in his "primitive or natural state" the black "in structural peculiarities and instinctive propensities" was more akin to the orangoutang than the Caucasian, he gave the impression of viewing the Negro as subhuman. Finally, in denouncing the advocates of black equality as "a class of fanatics . . . occupying the northern portion of our Union," he introduced the issue of sectionalism.[12]

As strongly as Forwood's contentions ran counter to his deep-seated beliefs, Butler remained silent. His only comment was a brief editorial statement: "The question discussed by Dr. F. is attracting considerable attention, and we trust that some one will carry on the discussion on the other side of the question."[13] Such was certainly to be the case.

Dr. William Johnson, an elderly practitioner in White House, New Jersey, who wrote under the pen name "Senex," reluctantly, but dutifully, penned a lengthy denunciation, published in two parts, of what he called Forwood's "tirade against the Bible." A Bible literalist, "Senex" asserted that there was "not a word" in it about different species of men "and the language cannot be forced into his construction." He feared that polygenism was an impious attempt "to nullify the atonement of Christ." The Saviour had died, he explained, for those "who were flesh of His flesh, and bone of His bone." If the Negro was not of the same species, then he could not "be benefited by His atonement." Having rejected polygenism as a spurious philosophy because it rested on an irreverent rejection of the authenticity of the Bible, "Senex" recommended the argument advanced by Dr. Samuel Stanhope Smith, his former teacher at Princeton, to explain the anatomical, physiological, and intellectual peculiarities of the Negro. Smith's *Essay on the Causes of the Variety of Complexion and Figure in the Human Species* (1787 and 1810), the first ambitious treatise on ethnology in the United States and long considered the standard American work on the subject, advocated the unity of the human species and attributed racial differences to climate and custom. While appalled at what he considered Forwood's blatant and unscientific attack on

religion, "Senex" agreed with him on black inferiority and abolitionism. The former he attributed to the curse of Ham; as for the latter, he remarked: "I am no 'northern abolitionist,' and do not wish in any degree to interfere with the domestic arrangements of the South."[14]

If "Senex's" religious broadside further threatened an impartial inquiry into man's origin, Butler compounded the danger. In an editorial comment he agreed with "Senex" that the question could not "be properly argued" without an appeal to the Bible and applauded him for having "brought forward the scriptural arguments so ably." He, too, felt that Forwood had spoken derogatorily of the Bible and labeled his action as "entirely unnecessary" and one that would "not help his cause in the least." Butler was forced into his uncharacteristic one-sided stance by a "good number of complaints" over having opened the pages of the *Reporter* to a discussion of man's origins. He defended the discussion as "a question of the times," while predicting: "We have every reason to believe that the ultimate result will be all that the friends of the Bible could possibly desire."[15] In private correspondence with Forwood, Butler reiterated his public admonition for "unnecessarily wounding the feelings of those who like myself reverence the sacred volume." At the same time, he expressed the desire to see that which he had just helped make impossible — "this subject in *its scientific aspect*. . . thoroughly discussed."[16]

Along with "Senex" appeared "Elihu," in reality Dr. A. Denny of Suggsville, Alabama. Little is known about Denny: he was a graduate of the Harvard medical school, the President of the Alabama State Medical Association shortly before the Civil War, and probably a lifelong resident of Alabama. A friend of Forwood, he entered the embryonic controversy on his side. Denny's involvement was, all things considered, detrimental to a successful debate. He dominated the younger Forwood, and his obsession with a metaphysical abstraction, which he called "undoubted truth," was a major factor in frustrating the discussion's objective. Denny was uncompromising in his quest for "undoubted truth," asserting: "I desire every man to unreservedly seek, receive and cherish . . . 'First principles,' or simple, primary, self-evident and demonstrative truths."[17] He repeatedly pelted Butler, who he insisted held an "unparalleled prejudice" against him, with rambling, abstruse propositions for achieving this end. Butler considered Denny "transcendental in his views of everything, and in his use of language" and tried "to hold him aloof."[18] But owing to Denny's friendship with Forwood and repeated demands that he be heard, Butler occasionally relented and published his views. In every instance he regretted having done so.

Against his better judgment, but owing to an honest desire that all parties be heard, Butler published Denny's assessment of the budding ethnological controversy in August, along with the second part of "Senex's" essay. Denny ignored the point of the discussion. Instead, he argued that there was an absence of "common premises" on which to base a debate and insisted that it was "manifestly *absurd*" to proceed further under such circumstances, as the outcome would be "strife and confusion" and "failure of the discussion to effect any good result." To prevent this impending failure, Denny offered to mediate a quest for common premises, if all the participants would "formally agree to a fair trial of this peaceful rule."[19] To Forwood, Denny predicted that Butler and the unitarists would not make such a pledge, showing that they were not "earnest seekers after the truth" and not entitled "to the attention of any true, or honest, man."[20]

In September, the dispute heated up appreciably. "Unity," an anonymous

physician, whose years of observing the striking differences between the races was, despite a strong reverence for the Scriptures, causing him to doubt that the entire human family had sprung from Adam, welcomed the discussion but was outraged at "Senex" for injecting religion into a scientific debate. He praised Forwood's article as a blow "for the sake of science and the advancement of knowledge over his own signature." With anticipation, "Unity" had looked "for some champion 'worthy of his steel,' on the side I lean to . . . take up the gauntlet so boldly thrown down, and treat it in the same manly spirit." "Senex's" effort was judged both feeble and embarrassing because of his reluctance to take a stand, cloak of anonymity, and tactics. "Unity" indignantly concluded: "It is not with *'reluctance'* that I write the above but with a great desire that the subject may hereafter be treated in the light science may afford, and theologists stand aloof, as God's kingdom and plans cannot be injured by the development of science. . . ."[21]

This issue also contained the first of several broadsides that Dr. John K. Ewcorstart, a Boston unitarist with abolitionist leanings, was to level. He assailed both Forwood and "Senex" — the former for his "stabs" at the Bible and Christianity and the latter for his acquiescence to "the very great inferiority of the negro." Even worse, Ewcorstart maintained, neither dealt directly with the main issue. He implored: "Let the question — *'Is the negro a distinct species?'* stand unembarrassed by any side issues. On these conditions, I am willing to take the negative, and defend it to the best of my ability."[22]

The month's final ethnological piece was a lengthy, abusive review of Nott's and Gliddon's two books — *Types of Mankind* (1854) and *Indigenous Races of the Earth* (1857) — by Abraham Coles, a Newark physician and an emotional unitarist. His impassioned condemnation of these two pillars of the American School of Ethnology included Forwood. Convinced that Christianity and unity "stand or fall together," Coles viewed Forwood's alleged attack on the church as illustrative of the "Downpulling and Disbelief" of the age, and denounced him as an "inexorable scientific iconoclast 'of the cherished idols of bygone centuries.' "[23] Unfortunately, this emotional outburst was not to be Coles's last.

Butler was becoming increasingly disturbed with the early tone and direction of the discussion and feared that it might get out of control. He used his monthly editorial to lay down some ground rules: "We must . . . decline, in the future, publishing anything . . . except over the signature of the writer. Nor shall we admit any disrespectful allusions to Holy Writ."[24] In a letter to Forwood, he implied that the former, while perhaps discouraging some potential participants who preferred to remain anonymous, would encourage greater responsibility by those who did participate, and the latter, while not precluding scriptural reference, which was deemed essential and unavoidable since the Bible was "a historical book," would help defuse some of the emotionalism of religion.[25]

October was a quiet month, bringing only a second installment of Denny. Butler gave him space in the *Reporter* only because Forwood had recommended that the paper be published. But instead of printing his latest propositions for achieving "TRUTH and truth only" as the basis of the ethnological discussion in their entirety, Butler synthesized them and tartly commented: "Inasmuch as truth is supposed to be the aim of all discussion, it strikes us that it would be a work of supererogation and unnecessary waste of time and space to press these inquiries . . . ."[26] Denny seethed at Butler's treatment of his essay. In a move that was to add to the controversy's growing disorder, he convinced Forwood that the publication of his

"suppressed" propositions, as he like to call them, in their original form was imperative to a successful outcome of the debate.[27]

Two new combatants, both polygenists, entered the fray in November. The first, Charles F. J. Lehlbach, was a Newark physician and represented the hitherto unseen combination of polygenism and abolitionism. He had been spurred to action by what he felt were attempts "to proscribe a whole race, as not entitled to freedom, on account of specific differences" and sought to show that a belief in multiple creations did not necessarily relegate the black to a position of inferiority. He attacked the arguments of "Senex" and Coles, the two most outspoken unitarists, to illustrate his argument. "Senex" had contended that polygenism denied the Negro salvation. Lehlbach found this contention shortsighted: "Suppose for a moment that the diversity of man's origin were true (as we believe it to be), would 'Senex' then *dare* to deny God's power of saving his black children notwithstanding?" In the course of his tirade against Nott and Gliddon, Coles had asserted that if the Negro was a distinct species there could be no common brotherhood of man. Viewing this assertion in the same light as he had Coles's impassioned tirade against Nott and Gliddon, Lehlbach unceremoniously dismissed it as meaningless. He attributed the brotherhood of man to the feelings of the human heart: "As long as man — be he black or white, bronzed or coppered — can sing and shout, weep or be merry, love and pray, there need not be any fear of destroying the brotherhood of men by the establishment of any scientific fact."[28]

The other new participant was Dr. S. C. Thornton, Jr., of Moorestown, New Jersey. He also represented a new position: a firm believer in the sanctity of the Scriptures, but a former student and active supporter of Morton, he could not see any fundamental inconsistency between the Bible and polygenism. He queried: "If the Scriptures can be so construed as to form the creeds of the three hundred religious sects that now exist without the commission of sacrilege, cannot they be construed in two different ways as regards the existence of the *genus homo,* also without sacrilege?" He suggested that a case could be made that plurality of origin was more consonant with Biblical doctrine than a unity of origin. For instance, it would do away with the supposition of incestuous intercourse among the immediate descendants of Adam. In agreement with "Unity," Thornton insisted that it was time to change the direction of the discussion; it had been monopolized by the "evidences of Christianity" for too long.[29]

Coles promptly struck back at Lehlbach. In a fiery rebuttal published in the December *Reporter,* he lashed out at the polygenists. The "harmless pop-guns of science," he proclaimed, would never prevail against "the impregnable high Fortress and Munition of Rocks in which our Christianity sits entrenched." As for their argument for multiple creations, it was simply the result of having jumped to conclusions about the permanency of racial types based on a few enticing examples from the monumental remains of Egypt and was easily refuted by the unitarist appeal to a single creation with racial differences resulting from environmental and societal factors, accident, and miraculous intervention. Like "Senex" he accused the polygenists of having taken "the first step in infidelity, which, most likely, will lead to another and another."[30]

Ewcorstart was also heard from a second time in December. He was furious at Forwood, charging him with having taken lightly his earlier appeal that "all side issues," religion in particular, be waived and the question of whether the Negro was a distinct species be discussed "on its merits." Forwood had not responded to him directly but had

written Butler, who had, without Forwood's knowledge, forwarded the letter to Ewcorstart, that he stood on his original position; if Ewcorstart did not choose "to discuss the subject in its present aspect, he may leave it to others." This response had infuriated Ewcorstart, as it was now clear that Forwood would rather see the main question lost in a meaningless theological dispute that to take steps to add focus to the debate. In his decided opinion, Forwood did not have a case: in his decision to attack religion he "could not have fallen into a greater error"; his attempt to prove the Negro akin to the monkey was "not supported by a single physiological, anatomical or psychological fact"; and his sentiments on abolitionism "prove too conclusively that their possessor does not entertain the feelings or the motives which aim to solve what he seems disposed to attempt." Not only had he failed to establish a standard by which the Negro might be proved to be a distinct species, "the slight variations" he offered as evidence, unsupported by fact or convincing argument, were just that — "mere variations." "The degradation of a race," he rebuked his Southern antagonist, "does not prove a difference in the species."[31]

The debate threatened to turn into a name-calling contest at this point, as Forwood reacted with hostility toward both Butler and Ewcorstart. He was incensed at the former's revelation of the contents of a private letter and the insulting tone of the latter's strictures. He complained to Butler, who stood his ground. The controversial letter was not private but a response to Ewcorstart's request published in the *Reporter*. Butler maintained: "I certainly had a perfect right to communicate your reply to him if I chose." As for Ewcorstart's article, he called it "the only real attempt" to reply to Forwood's own. "It strikes me" he lectured his youthful assailant, "that you are a little hard to please in regard to the ethnological discussion. A man can hardly expect to have everything 'his own way' in a discussion .... If you feel disposed to drop the discussion as it stands, and think you can *afford* to do so, I am sure I have no objection, though I should think that if you did so you would lay yourself open to a charge of trifling with the subject."[32] Forwood retreated.

The new year began as if the debate was commencing anew with broadsides from "Senex" and "Elihu." "Senex," now using his true name, William Johnson, aptly noted that the discussion threatened "to become interminable," since "after spilling much ink and wasting much paper" neither side seemed "willing to yield the field." He certainly was not, nor was he willing to moderate his Christian crusade. Dismissing complaints that it was in poor taste to introduce theological arguments into a scientific journal, he exclaimed: "The Bible is either untrue (I speak it with reverence) or the theory of diversity of the species is false. There is no other alternative." He restated his earlier arguments in favor of the Biblical account of creation and commented on several points that had arisen since his first essay was published. He regarded Thornton's intimation of incestuous intercourse between the descendants of Adam as irrelevant, since God did not declare such marriages incestuous until after the departure ofthe Israelites. He ridiculed the polygenist suggestion of centers of creation, demanding to know: "How many centres do you reckon up, gentlemen? Forty? or thirty? or twenty? or will you modestly take up with five? He claimed that there was a fundamental weakness in the polygenist argument that had been hitherto overlooked: a belief in multiple creations did not account for the universality of moral evil, "Heaven's declared sentence against all the family of man." Johnson took leave of the debate in the same manner that he had entered it the previous summer, convinced that polygenism "underlies the

rankest infidelity, and is derogatory to our Maker, and subversive to the best interests of man."[33]

"Elihu" also wrote under his real name, A. Denny. His contribution, again published at Forwood's urging and against Butler's will, was another discursive installment in his obfuscating crusade for "undoubted truth." He continued to berate the ethnological discussion as being in a state of "undoubted disorder" and resounded his call for the adoption of "decency, order, and undoubted truth" as a preventive against further disarray. Tactlessly, he demanded that Butler publish his "suppressed" propositions of the previous fall. At the end of this rambling harangue, Butler appended a seemingly appropriate editorial "EGADS."[34]

February brought a long-anticipated second essay from Forwood. Despite the concerted unitarist attack of his opening statement, it contained little new. In fact, Forwood announced that his earlier arguments "stand as yet without authoritative contradiction," and the present paper was written expressly to call attention to recent scholarly developments that bolstered them. There followed a detailed summary of the principal arguments of the leading polygenists, Nott and Gliddon in particular. Showing Denny's influence, Forwood called for "a peaceful, orderly, and truthful disquisition of the facts" and announced himself ready to adopt his "broad and substantial basis of 'undoubted truth'" for the government of the discussion. Despite the confused state and unclear direction of the discussion, Forwood was confident of victory. He asserted: "We send this paper forth 'like bread cast upon the water,' with a certain confidence that it will return after many days with its facts conceded."[35]

Editorially that month, Butler defended the debate against charges that, owing to the infancy of ethnology, it was premature. He maintained that the question of man's origin was "every day attracting more attention, both in and out of the medical profession" and asked for "a patient hearing of both sides." From those involved, he sought "a spirit of candor, and . . . an humble sense of the majesty of the Deity, the perfection of His works, and the utter insignificance of man in comparison."[36]

In March, Butler caved in under the pressure of Forwood and Denny and published the latter's "suppressed" propositions. Butler complained to Forwood: "It *wastes* two pages in my March number."[37] The piece's tortuous syntax and tiresome message of "undoubted truth" lend credence to Butler's low estimate of it.

The March *Reporter* also contained a study which, while not written for the journal's ethnological debate, shed fresh light on it. Henry R. Baldwin, a physician from New Brunswick, had prepared the paper for the Medical Society of New Jersey, which had urged its publication. It was an argument for the unitarist position from the perspective of "the broad basis of similarity of races." Baldwin held that many points of similarity existed between all nations, that the material world was singularly adapted to the wants of man, and that man was uniquely fitted for the exploitation of his surroundings. Such marked similarities, Baldwin contended, could not have emanated from several centers of creation but, rather, were "a gift of the Creator" who had created man for moral ends toward which he was inexorably moving. He strongly denied that "commingling of the races" produced hybrid offspring intermediate between the parents, a principal polygenist contention, but did concede that there might have been centers of creation for plants and animals inferior to man, another popular polygenist argument.[38]

Butler wrote to Denny after the appearance of his March commentary, either seeking to

assuage the latter's wounded feelings or believing that he needed individualized instruction concerning any further participation in the discussion. He warned that any future contribution must be governed by *"brevity,* originality, point (or 'basis'), & *respect* for the opinions of others, & especially of that Book which so large a part of the civilized world regard as inspired." Strangely, he also chose to share his thoughts about the state of the debate with him. Butler admitted concern that the proceedings were monopolizing the pages of the *Reporter* "to little or no purpose." Many readers were growing tired of the whole affair, and unless it developed "something original very soon," he feared a loss of interest in the journal. Unfortunately, "up to this time," he observed, "there seems to be a want of the 'common basis' of which you wrote," as each side was engaged in a campaign of "assertions and quotations which are not to the point." Butler was becoming convinced that if this condition continued he would be compelled to limit the attention given to the discussion, "if not cut it off altogether."[39]

This was a windfall opening which Denny could hardly believe. He quickly concurred with Butler that the controversy was taking up too much space and that this situation was indeed the "inevitable consequence of what you say 'seems to be a want of the common basis.' " Denny feigned having himself grown tired of the discussion long ago. He stated that the *Reporter* had already suffered from it and would lose even more if Butler did not allow "orderly men 'a patient hearing.' " Should this be done, Denny felt the debate might be salvaged.[40] He gleefully reported Butler's apparent predicament to Forwood and urged a polygenist offensive to capitalize on this opportunity: "Time is precious — the patient is *exhausted!* and he must have, at once, a powerful stimulus — pitch into him! *immediately,* you . . . and *all* your friends."[41]

The two ethnological essays Butler published in April well illustrate his fear of a deteriorating debate. The first was largely another chapter in the growing prvate war between Lehlbach and Coles. In it, Lehlbach again dismissed Coles's arguments for the unity of mankind as little more than "a reiteration of the assertion that the Bible is competent to teach on purely scientific facts." He offered in its place a stirring appeal for the primacy of science in the question of man's origin: ethnology dealt with a subject capable of progress, while the Bible dealt with revelation which was "at once perfect and forever perfect"; the Bible was intended as a moral and religious code and to make it an authority for science was "the highest of follies" and the introducing of it into an ethnological discussion was "not only uncalled for, but highly objectionable"; and a belief in the diversity of the origin of mankind was "no more a proof of infidelism" than a belief in the earth moving around the sun, the opposite of which was clearly and unequivocally implied in the Bible. Thus, it was among "the palpable facts of the history of the human races" that the search for man's origin should be conducted, the results of which, Lehlbach was confident, would produce "the most unequivocal proofs of diversity, not only in color, cranial formation, but in culture, intellectual development, and manifest destiny." After a thorough assailing of Ewcorstart for his December treatment of Forwood, Lehlbach added his assent to Denny's call for order and an end to "odious epithets": "It is time that this discussion should assume a more calm and less desultory character."[42]

The month's second contribution was from Ewcorstart. He continued to view the discussion as at a standstill with no probability of improvement. The polygenists were clearly at fault; they refused to adopt a consistent stand and their assertions were not

backed up "by facts or arguments." Tired of their waffling, Ewcorstart issued a personal statement on the question of Negro inferiority. From the outset of the debate he had tried unsuccessfully to pin Forwood down on a set of principles for judging the black inferior. To him the answer was simple: "We set ourselves up as models of perfection and regard that which approaches nearest us as nearest perfection, and that which recedes the most from us as nearest imperfection." In the Negro's case, he was damned by his condition, as men "rarely see talents and virtues" in those whom they have oppressed. In reality, Ewcorstart claimed, the Negroes in America were descended from "the most degraded and deformed of Africans" and could not be considered as typical of the black race. Rather, a careful examination revealed that Africa was peopled by individuals demonstrating the same diversity of countenance, complexion, and intellect found among white Americans. In fact, he asserted, Ethiopia was "undoubtedly the birthplace of man" and "the first man was an African." The white race, he speculated, sprang from albinos who were treated as inferiors by the blacks and driven from their native land to the less inviting areas of northern Europe.[43]

Buoyed by Butler's seemingly belated realization of the futility of continuing the ethnological debate without a "common basis," Denny quickly drafted a new proposal for attaining one to be included in the May *Reporter*. To his great surprise, it was rejected. Reiterating his dismay at the time already spent airing tangential opinions and the disappointing tone this unexpected development had given the proceedings, Butler remarked: "We can see no good that can possibly result from a further preliminary discussion of the Ethnological question . . . "[44] To Forwood, he exclaimed: "I cannot give any more room to such stuff from anybody."[45] Denny felt betrayed and greeted Butler's action with outrage. He charged that Butler was determined that "there shall be no *common basis"* and was "unworthy the attention of any honest man." He urged Forwood and the other polygenists to "have nothing further to do with Butler & Co. in this discussion, other than to act in self defense and protest continually that you cannot honestly 'tolerate' such indubitable disorder and other contrariness to 'undoubted truth' — 'said common basis,' and would not if you could."[46]

R. I. Jackson, the debate's only layman participant, was heard from in May. Although he resided in Harford County, Maryland, Forwood's home, there is no evidence that the two knew one another. In reality, Jackson avoided taking a side, claiming only to be a "*common sense reader.*" As such, he wrote to call attention to several significant incongruities in Baldwin's argument for the unity of man based on similarities between races. Jackson accused him of violating both reason and general knowledge. By way of example, he pointed out: "Our observation is that the cases of insanity with the negro bear no comparison to that of the white race, and all medical authority that I have any knowledge of agree that the negro is almost exempt from yellow fever and other diseases fatal to the white race, and *vice versa.*" He also scored Baldwin's concession to the polygenists of likely centers of creation for plants and animals inferior to man, calling it an apparent abandonment of the Biblical account of creation and as such a severe blow to the Bible. Claiming that his "only desire" was "to try to confine the contestants to the subject of the controversy" and "the development of scientific truth," he asserted: "In the name of humanity, can the scientific advocates of the unity theory not give us scientific proof (not speculation) of the truth of their position, without impairing what we believe the truths

of the Bible, at least equal to that of the opposition . . . "[47]

In June, while in the process of rejecting another of his manuscripts, an exasperated Butler informed Denny that "the discussion of the Ethnological question has we think gone far enough, as a majority of readers in all parts of the country seem to be tired of it." A final installment was to be published in July.[48] In character, Denny remarked that the decision to terminate the debate was the inevitable result of the state of confusion which existed and charged that Butler "knowingly (and of course willingly) offered, received, tolerated and persisted in these disorders."[49]

As Butler had promised, the *Reporter's* last ethnological piece appeared in July. It was contributed by T. C. Rogers, a practitioner in Willow Grove, Delaware. He rejected Ewcorstart's position on black inferiority and attacked his behavior during the debate. A point-by-point examination of his contentions, Rogers believed, failed to disprove a single one of Forwood's arguments for the Negro as a distinct species. Such an examiation, however, did show Ewcorstart's preference for personal warfare over the power of persuasion and a great confidence and reliance in his own authority. Behavior of this type was unacceptable from a man of science. Rogers admonished: "When scientific men disagree on any one point they appeal to *argument* and *demonstration* for the settlement for their disagreement." In light of this situation, he was certain that a "manifest disorder" prevailed in the proceedings and urged the implementation of Denny's plan for order. At the end of his essay, Rogers, albeit unintentionally, penned a fitting epitaph for the now moribund ethnological debate: "Where intolerance, passion, and prejudice control and direct the faculties, we turn away in sadness and sorrow, painfully impressed with the weakness and perfidity of erring human nature."[50]

Butler's termination of the debate brought cries of foul from Forwood, Denny, and the other polygenists, and for over a year they attempted to force its reopening. They resorted to a variety of tactics: they pooled their energies in a united front with Denny as their chief spokesman; they considered attempting to publish a formal protest of Butler's management of the proceedings in the *Reporter;* they gave much thought to the publication of a review of the entire affair, along with several allegedly suppressed papers; and they debated sponsoring a work on the nature and indispensability of "undoubted truth," even toying with the idea of offering a cash prize for the best essay on the subject. But by the end of 1859 the polygenist united front had come undone. Its disintegration is largely attributable to the lack of tangible results, Denny's continuing abstractness, and the effects of passing time.[51] In the end, only Forwood and Denny were left. They continued their joint efforts until the outbreak of war in 1861. Chief among their accomplishments were Forwood's publication of a lengthy review of the ethnological question in general in the *Maryland and Virginia Medical Journal* in the summer of 1860 and Denny's contribution of a short piece on the logical use of such terms as "genus," "species," and "variety" to the same journal the next spring.[52] But the end was at hand; the Civil War was about to burst on stage, and in the wings Charles Darwin waited.

Despite the vast amount of intellectual energy expended and the hundreds of pages it filled, the *Reporter's* ethnological debate ended in an acrimonious stalement and contributed little to the resolution of the question of man's origin. This is not to suggest, however, that the discussion is without historical significance. On the contrary, it was in every way a microcosm of

what was likely the single most important division in American science during the half century preceding the Civil War, and serves as an informative example of the broader controversy. As was the case nationally, the role of the polygenists in the *Reporter*'s debate seems to deserve particular notice. Less apparently in this instance, they helped pave the way for the advent of Darwinism through their rejection of biblical chronology and arguments in favor of hybridity. The former helped prepare the public mind for the Darwinian chronology, and the latter became recognized as a crucial causative factor in evolution. More noticeable here, and of perhaps greater importance, the polygenists challenged clericalism and biblicism and in doing so contributed to the breaching of the theological defenses inhibiting freedom of inquiry. In the end, then, it seems safe to say that Forwood and his beleaguered band of polygenists played at least a small role in the rise of modern biological science in America, not because their stand was valid or victorious but by their insistence that free inquiry, so crucial to scientific advancement, not be stifled by the inhibitive influence of orthodox religion. As Forwood perhaps best put it: "We write for the scientific advance of humanity in *temporal* things; with the *spiritual* it is not our province to deal. We state, and we call for, *facts, not opinions* . . . ."[53]

REFERENCES AND NOTES

1. W. S. Forwood, The negro — a distinct species, *Med. Surg. Rep.* 10:234, 1857.

2. At the outset of the debate the journal was published in Burlington, New Jersey. It was moved to Philadelphia in the spring of 1858. See S. W. Butler to W. S. Forwood, February 24, March 2, April 17, 1858, William S. Forwood Papers, Trent Collection, Duke University, Durham, North Carolina. (Hereafter cited as Forwood-Duke.)

3. An excellent summary of the history and significance of the American School of Ethnology, and the one on which the foregoing sketch is based, is D. A. Swan, The American school of ethnology, *Mankind Q.* 13:78-98, 1971. The standard works on science and race in antebellum America are W. Stanton. *The Leopard's Spots: Scientific Attitudes toward Race in America, 1815-59.* (Chicago: University of Chicago Press, 1960); G. M. Fredrickson, *The Black Image in the White Mind: The Debate on Afro-American Character and Destiny, 1817-1914.* (New York: Harper & Row, 1971), chap. 3; and W. S. Jenkins, *Pro-Slavery Thought in the Old South.* (Chapel Hill: Univ. North Carolina Press, 1935), chap. 6

4. It is impossible in a study of this length to describe in detail the arguments of the various participants. This paper, while attempting to present their chief contentions, is more concerned with the character and fate of the controversy.

5. The best sketch of Forwood's life is William Stump Forwood, *Trans. Med. Churg. Fac. Md.* (Baltimore) pp.72-75, 1892. Unless otherwise cited all material pertaining to his life is based on this account.

6. A. Denny to W. S. Forwood, December 18, 1860, William Stump Forwood Papers, Southern Historical Collection, University of North Carolina, Chapel Hill, N.C. (Hereafter cited as Forwood-UNC.)

7. W. S. Forwood, President Lincoln on emancipation, *Southern AEgis,* March 22, 1862. Manuscript in Forwood-UNC.

8. W. S. Forwood, Slavery as the cause of the war, *Southern AEgis,* n.d.

9. W.S. Forwood, The irrepressible conflict, *Southern AEgis,* September 13, 1862. For a typical example of Forwoods ongoing anti-Negro sentiment, see W. S. Forwood to Frederick Strump, March 13, 1865, Forwood-UNC.

10. The best sketch of Butler's life is Dr. Samuel Worcester Butler, *Med. Surg. Rep.* 30:59, 1874.

11. For Butler's initial reaction to Forwood's essay, see S. W. Butler to W. S. Forwood, March 9, 1857, Forwood-Duke.

12. W. S. Forwood, *Med. Surg. Rep.* 10:225-234, 1857.

13. S. W. Butler, Editorial Correspondence, *Med. Surg. Rep.* 10:246, 1857.

14. "Senex," Is the negro a distinct species? Answered in the negative. In reply to an article by S. W. Forwood, M. D., *Med. Surg. Rep.* 10:288-301, 375-86, 1857; see also S. W. Butler to W. S. Forwood, June 16, 1857, Forwood-Duke.

15. S. W. Butler, Ethnology, *Med. Surg. Rep.* 10:307-309, 1857.

16. S. W. Butler to W. S. Forwood, June 16, 1857, Forwood Duke.

17. A. Denny to W. S. Forwood, September 9, 1859, Forwood-UNC; also April 4, 1857, April 27, July 9, 1858. For an example of Denny's influence on Forwood, see A. Denny to W. S. Forwood, August 22, 1857, Forwood-UNC. The animosity between Denny and Butler seems to have dated from 1854 when the latter rejected one of Denny's articles submitted for publication in the *Reporter;* see A. Denny to W. S. Forwood, April 27, 1858, Forwood-UNC.

18. S. W. Butler to W. S. Forwood, September 18, 1857, Forwood-Duke.

19. "Elihu," Some remarks in regard to the ethnological discussion in progress in the pages of the *Reporter, Med. Surg. Rep.* 10:389-91, 1857; A. Denny to W. S. Forwood, August 22, 1857, Forwood-UNC.

20. A. Denny to W. S. Forwood, July 12, August 22, 1857, Forwood-UNC.

21. "Unity," The negro — a distinct species. Remarks on the articles by W. S. Forwood, M. D., and "Senex,"*Med. Surg. Rep.* 10:457-59, 1857.

22. J. K. Ewcorstart, Is the negro a distinct species? The question to be relieved of its side issues, *Med. Surg. Rep.* 10:459, 1857.

23. A. Coles, A critical notice of Nott & Gliddon's ethnological works, *Med. Surg. Rep.* 10:417-49, 1857.

24. S. W. Butler, The ethnological discussion, *Med. Surg. Rep.* 10:464-65, 1857.

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26. S. W. Butler, Truth the basis of discussion, *Med. Surg. Rep.* 10:511-12, 1857; see also S. W. Butler to W. S. Forwood, October 6, 1857, Forwood-Duke.

27. Denny valued these propositions so highly that he suggested a collective effort on the part of the polygenist participants to force Butler to publish them; see A. Denny to W. S. Forwood, October 16, 22, November 8, 28, December 3, 1857, Forwood-UNC.

28. C. F. J. Lehlbach "Is the negro a distinct species" — A reply to "Senex," and an anti-criticism to Dr. Cole's criticisms of Nott and Gliddon's works, *Med. Surg. Rep.* 10:532-41, 1857.

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30. A. Coles, The unity of the origin of mankind, supported by scripture, by reason, and by the investigation of science. *Med. Surg. Rep.* 10:582-99, 1857.

31. J. K. Ewcorstart, The negro not a distinct species, *Med. Surg. Rep.* 10:582-87, 1857.

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34. A. Denny, A call for order in the ethnological question, *Med. Surg. Rep.* 11:19-22, 1858; see also A. Denny to W. S. Forwood, December 2, 22, 1857, Forwood-UNC; S. W. Butler to W. S. Forwood, December 11, 1857, Forwood-Duke.

35. W. S. Forwood, The negro — a distinct species, no. 2, *Med. Surg. Rep.* 11:69-95, 1858; see also S. W. Butler to A. Denny, March 22, 1858, in A. Denny to W. S. Forwood, March 30, 1858, Forwood-UNC. Denny was thoroughly pleased with Forwood's study and proposed attempting to get it wider recognition; see A. Denny to W. S. Forwood, February 27, 1858, Forwood-UNC. But this and similar attempts to interest leading polygenists in the debate proved unsuccessful and it remained a local affair; see J. C. Nott to W. S. Forwood, February 27, 1858, Forwood-Duke; A. Denny to W. S. Forwood, March 22, April 15, 20, 1858, Forwood-UNC; Samuel A. Cartwright to W. S. Forwood, March 24, 1858, Forwood-Duke; Joseph Leidy to W. S. Forwood, March 29, 1858, Forwood-Duke.

36. S. W. Butler, The ethnological question, *Med. Surg. Rep.* 11:136-37, 1858.

37. "Elihu," Ethnological discussion, *Med. Surg. Rep.* 11:157-59, 1858; S. W. Butler to W. S. Forwood, January 28, 1858, Forwood-Duke. See also A. Denny to W. S. Forwood, January 13, 26, February 27, 1858, Forwood-UNC. Denny retorted: "I am not at all surprised at Butler's expressions of pain! . . . If my *style* and *manner* of signifying the indisputable truth does not please him, then let him try his hand at it." See A. Denny to W. S. Forwood, February 14, 1858, Forwood-Duke.

38. H. R. Baldwin, Unity of the human race, *Med. Surg. Rep.* 11:141-51, 1858.

39. S. W. Butler to A. Denny, March 22, 1858, in A. Denny to W. S. Forwood, March 30, 1858, Forwood-UNC.

40. A. Denny to S. W. Butler, March 31, 1858, Forwood-UNC.

41. A. Denny to W. S. Forwood, April 2-3, 1858, Forwood-UNC. By this time, the debate's polygenists were beginning to correspond with one another; see for example, A. Denny to W. S. Forwood, May 20, June 13, 20, 1858, Forwood-UNC.

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44. S. W. Butler to A. Denny, April 20, 1858, Forwood-UNC.

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50. T. C. Rogers, The negro — a distinct species. — A notice of Dr. John K. Ewcorstart's article in the April no. of the *Reporter, Med. Surg. Rep.* 11:448-58, 1858.

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Compiler's Commentary on Sherlock Holmes Papers

By D. I. LANSING, M.D.*

It is, of course, not necessary to know even one small thing about the world of medicine and health to enjoy Sir Arthur Conan Doyle's tales of Sherlock Holmes. For years, his *Adventure of The Red Headed League* was used in anthologies to spark interest in reading for the junior high school students in America. But the truth of the matter is that Sherlock Holmes stories are intensely medical in nature — indeed, singularly so. The addition of an education in the world of medicine to a pre-existing love of reading about Conan Doyle's hero brings a special aura to his marvelous tales, on the constant rereading one gives them as the years go by. The delicious world of the dun-colored fogs of London town and the chase through Edwardian towns and villages and the surreptitious peeks at hidden aspects of its society becomes a literary love affair of Aescalapian spice. It should come as no surprise to our readers therefore, that when the Section on Medical History asked the distinguished dermatologist and Fellow of the College, Dr. Herman Beerman,† to put on a symposium on Sherlock Holmes and Medicine in March of 1976, the response was a packed house and standing-room-only. It was with great difficulty that we prevailed upon our four busy speakers to commit their works to paper for the benefit of us all. They are herewith printed intact, by *Transactions and Studies,* as a medical first for America's oldest medical journal.

*Clerk, Section on Medical History, College of Physicians of Philadelphia.

†See John H. Watson, M.D. 1977. The adventure of the eminent physicians. *Quill* Pennsylvania Hospital, Summer, 1977.

Cordially

Sherlock Holmes and Medical History

By HERMAN BEERMAN, M.D.*

When I was asked to help organize this session on Sherlock Holmes, I asked myself why we should have a session on Sherlock Holmes in the Section on Medical History of the College of Physicians of Philadelphia. My first reaction was that the program committee was really in a bind and could not fill in the program slot with legitimate medical history. However, further reflection showed the wisdom of the committee. I was happy to accept this assignment, since I have always had an interest in Sherlock Holmes. I knew from my recent intensified participation in several of the societies devoted to the Master that there were available speakers knowledgeable on topics germain to the interests of this Section. Furthermore, Christopher Morley's aphorism "Never had so much been written by so many for so few" is no longer valid since the world-wide interest in Sherlock Holmes has produced an enormous number of coteries devoted to the Canon.

Now, for the excuses or reasons why we are here. The Sherlockian literature is replete with physicians: written for the most part by a physician (John H. Watson, M.D.) about a detective who was medically oriented and was actually doing biochemical research (Sherlock Holmes). A physician was the literary agent (Sir Arthur Conan Doyle). In addition, the stories involved a number of physicians of the Victorian Era: Leslie Armstrong, Sir James Saunders, Dr. Ainstree, Jasper Meek, Penrose Fisher, James Mortimer (not the one responsible for Jonathan Hutchinson's *Mortimer's Malady*), Grimesby Roylott, and young Stamford and Percy Treveylan. Indeed, the cases offer an authoritative insight into the type of medical practice of the era, the status of specialists and many other medical data of the period. In fact, VanLiere, a well know Sherlockian, Dean of a Medical School, in his delightful *Doctor Enjoys Sherlock Holmes,* details among other topics: The Anatomical Sherlock Holmes; Brain Fever and Sherlock Holmes; Curare and Sherlock Holmes; Sherlock Holmes and the Portuguese-Man-of-War; Doctor Watson and Nervous Maladies; Dogs and Sherlock Holmes; The Botanical Doctor Watson; The Surgical Doctor Watson; Sherlock Holmes the Chemist; Doctor Watson's Universal Specific; Doctor Watson the Endocrinologist; Genetics and Sherlock Holmes; The Zoological Doctor Watson; Doctor Watson and Sherlock Holmes; Perennial Athletics; The Therapeutic Doctor Watson; and Doctor Watson, General Practitioner. Obviously, this is only a partial list of the medical topics in the Canon. An examination of a listing of the diseases mentioned in the cases gives a cross section of the medical problems of the time. These included, among others, aigue, brain fever (recently discussed in the *Journal of the American Medical Association*) aneurism, apoplexy, decline, diabetes, diphtheria, dropsy, drug addiction, enteric fever, poor eyesight, fear, ichthyosis, heart weakness, attacks, insanity, leprosy, malingering, mental and nervous disorders, pneumonia, pseudoleprosy, quinzy, senility,

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strokes, Tapanuli fever, Tatto, and Yellow fever. It will not be possible nor proper to discuss each of these from a historical perspective, but I would like to make a few comments about some. Interest in Sherlock Holmes affairs leads to many byways. On one occasion I had an opportunity or urge to evaluate Sherlock Holmes's, or Doctor Watson's or Dr. Doyle's dermatological competence. In the *Blanched Soldier* it was Sherlock Holmes who knew from the start that Emsworth's depigmented skin was not leprosy, but thought incorrectly, however, that it was pseudoleprosy or ichthyosis. I thought this was very fishy and proved, at least to my satisfaction, that he had vitiligo and certainly not tinea versicolor, as contended by Doctor Silberstein (who, when he wrote his paper, was an orthopedic resident!). Tattoo, which has such an important place in identification, is mentioned only three times in the Canon, and one of the so called tattoos was not really a tattoo. Malingering is given prominence in the *Dying Detective*. I could not find Holmes's monograph on this subject and so had to write my own, which appears in *The Further Leaves of the Copper Beeches*. It is worthy to note that in this case Holmes was "suffering," actually feigning, from a rare disease he called Tapanuli fever or the "Black Formosa Corruption." The identity of the disease Sherlock Holmes was simulating has been the subject of much discussion. In a scholarly presentation, Hugh L'Etang, in 1959, said, "I shall leave it to you to decide whether the last word has not been said about the 'Black Formosa Corruption.' " Although Tsutsugamushi Disease or Scrub Typhus was suggested, in 1967 Ober, in the *New York State Journal of Medicine,* stated that "we are perforce led to a clinical diagnosis of Tsutsugamushi disease." The two Jenkins commented on Ober's study. W. S. Jenkins noted that it was impossible that the process was Tsutsugamushi Disease. W. S. Jenkins, in his article on Dendroscandology (Go-Climb-a-Tree-Department), chides Ober for his attitude on the literary merit of the Sherlock Holmes stories, and he remarked about the persistence of the adolescent tastes of devotees of the Master ("a cult of Sherlockolatry") into adult life as well as minimizing Conan Doyle to the point of "nihilpilification."

An important but overlooked historical fact is that in a *Study of Scarlet,* written in 1886, Doyle described in Jefferson Hope what is now known as Marfan's Syndrome, which was first described in the medical literature in 1896. Cooperman wrote in *The Canadian Medical Journal* in 1975 that Doyle "described Marfan's Syndrome before Marfan!" In another letter in the same Journal later in 1975 Redmond, a Canadian Sherlockian and librarian of note, agrees with Cooperman and states that this "reinforces the judgment that Arthur Conan Doyle was an astute diagnostician, admirably trained in Edinburgh under Joseph Bell."

The late Dr. Joseph W. Klauder, a well known Sherlockian, pointed out that Sherlock Holmes would have been a good dermatologist. This is due to the fact that dermatology, although a highly visible specialty, requires intense observation. Dr. Klauder in two interesting studies noted that Doyle's teacher, Joseph Bell, observed "eyes and ears which can see and hear, memory to record at once. . .precise and intelligent recognition and appreciation of minor differences as the essential factor in all successful medical diagnosis." Throughout his life Dr. Bell continued to amaze his circle through his keen observation and deduction. Dr. Doyle when a student at Edinburgh (1876-81) was much impressed by the powers of observation and deductions of his teacher Joseph Bell. This inspired him to create Sherlock Holmes, the prototype of Doctor

Bell. "Keen observation, intense inspection of the subject, attention to details, and apparent trifles so much emphasized by Sherlock Holmes are particularly pertinent to the dermatologist, in fact for all practitioners of medicine."

Time does not allow elaboration of the various medical items mentioned earlier. However, a few notes on some can be made here.

CHEMICAL PROBLEMS IN THE CANON

Although at the time of Sherlock Holmes, biological chemistry was in its infancy, Holmes showed a great interest in it. Watson noted that in the rooms at 221 B Baker Street there was a formidable array of bottles and test tubes with the pungent cleanly smell of hydrochloric acid. Holmes often told Watson that he had spent his day in chemical work. Holmes was even reputed by good authority to have studied in Johns Hopkins University in Baltimore. He claimed to have discovered a new test for hemoglobin which, alas, did not help in differentiating animal from human blood.

HOLMES AND ANATOMY

Holmes's interest in anatomy, including osteology and anthropology, has afforded us with pertinent information on the 19th Century method of teaching anatomy and the embalming procedure. His discussion of the surface anatomy of the ear in *The Adventure of the Cardboard Box* is a good example:

> ...there is no part of the body which varies so much as the human ear. Each ear is as a rule quite distinctive and differs from all others.... I examined the ears in the box with the eyes of an expert and had carefully noted their anatomical peculiarities.... I perceived that her (Miss Cushing's) ear corresponded exactly with the female ear I had just inspected. The matter was entirely beyond coincidence. There was the same shortening of the pinna, the same broad curve of the upper lobe the same Convolution of the inner cartilage. In all essentials it was the same ear. Of course, I at once saw the enormous importance of the observation. It was evident that the victum was a blood-relative, and probably a very close one.

SHERLOCK HOLMES AS AN ANTHROPOLOGIST

Dr. Wilton M. Krogman, formerly head of the Department of Physical Anthropology of the Graduate School of Medicine, University of Pennsylvania, states:

> Today, with our modern techniques, our specialized knowledge, and our interdisciplinary integration, it is all too easy to sit on the seat of the scornful and say that Holmes' knowledge and use of anthropology was — to use his own term — "elementary" certainly he made "boners" in osteology, his knowledge of the infrahuman primates was woefully scant, and his failure to use finger-prints in detection was a gap in his technical skills! These are, I feel, the inadequacies that make Holmes, the man, human and not the superdetective Watson built him up to be. All in all, let us accept his use of anatomy (including "physical anthropology") at a pretty high level. Mayhap, his monograph on tobacco and tobacco use and his essay on bees were more objective and scientific, based as they were upon personal experimentation and study. Yet I for one, am willing to recognize in Sherlock Holmes a most worthy colleague in Anthropology — the science of man and his behavior!

NERVOUS DISEASE IN THE CANON

Neuropscychiatric matters were constantly referred to in the Canon: depression, hysteria, St. Vitus Dance, muscle twitching, shattered nerves, wreck and state of collapse from nervous exhaustion, nervous breakdown, cold sweat, and stroke. Most of these nervous and psychiatric maladies were in the nature of acute episodes.

Brain fever, discussed as recently as 1952 in the *JAMA*, was well known to Holmes. In one of his cases the housemaid "had a sharp touch of brain fever." In the *Musgrave Ritual* he stated, "For two days (she) had been so ill, sometimes delirious, sometimes hysterical...." Brain fever was also mentioned in *The*

Adventure of Copper Beeches (so dear to Philadelphians) and in the *Adventure of the Cardboard Box.* There was much criticism of Holmes's and Watson's use of the brain fever concept, but the recent vindication in the *JAMA* places this diagnosis in good repute.

DR. WATSON, ENDOCRINOLOGIST

Dr. Watson and Holmes were aware of the possibilities of injections for rejuvenation and made discourse on "Monkey gland" injections in the *Adventure of the Creeping Man.*

GENETICS AND SHERLOCK HOLMES

This aspect of medicine has received much attention from Sherlockians. VanLiere mentioned a number of instances in the Canon in which hereditary matters were involved. David Musto, in a more recent presentation, discussed heredity in the stories from a variety of standpoints including Nineteenth Century Theories of Inheritance, Darwin, Galton, and Mendel, Holmes's contribution (on ears in the Anthropological Journal), Inheritance of personality, particulate Inheritance, Holmes and Moriarty and Holmes's Ancestry.

SHERLOCK HOLMES AND ATHLETICS

Sherlock Holmes had an interest in many sports, probably a reflection of Arthur Conan Doyle's competition in numerous sports. These athletic aspects of the Canon are detailed by Cantwell in a recent (1975) issue of *Sports Illustrated* magazine.

POISONS IN THE CANON

Dr. George Koelle, Chairman of the Department of Pharmacology at the University of Pennsylvania, discussed in the *Leaves of the Copper Beeches* the poisons in the Canon. They include chloroform, sulfuric acid, opium, prussic acid (KCN), arrow poison, poisons of animal origin, biologic warfare, and the Devils foot. Other agents closely allied to poisons were also given attention. These include cocaine. A long commentary could be made on each of these items mentioned, but suffice it to say that the one which has received much attention recently is cocaine. This preparation stimulated the early careers of two brilliant investigators, Sigmund Freud and Sherlock Holmes. Details of cocaine in the Canon can be obtained in David Musto's *A Study in Cocaine* and Nicholas Meyer's *Seven Per cent Solution.*

THE THERAPEUTIC DR. WATSON

The therapeutics of the 1880s was limited to a relatively small list of preparations; many of these are mentioned in the various stories. Dr. Watson's chief therapeutic agent, certainly the one he used most often, was brandy — for himself, for fainting, for paleness of shock on the hearing of bad news, for pneumonia, at times of relaxation from tension, as a stimulant for recovery from Portuguese Man-of-War stings and so on. Even the Canon served a therapeutic purpose. In 1893 Robert Louis Stevenson wrote Doyle that Sherlock Holmes adventures were a cure for toothache and pleurisy.

MODES OF DEATH

The Canon is replete with information on the methods and manner of deaths possible in the Victorian Era. Where can one, in one place, have such a wealth of material? People were destroyed or died accidentally, by alcoholism, apoplexy, asiatic fever, at sea, beaten on the head with a club, by a life

preserver, by a poker, by a stove, and by a wooden leg, from a broken heart, by a dart, by diseases, drowning, explosion, fall from a height, by gas, by hanging, horse kick, hydraulic pressure, mire, poison, senility, snake bite, by a shot, shotgun, by stabbing, by suffocation, suicide, thrown out of town by a dog and by unknown causes.

THE DOCTOR, MEDICAL EDUCATION AND THE DETECTIVE STORY

Nancy Hoffman in her excellent article on The Detective Story points out that, in detective stories, physicians

> make excellent protagonists as detectives because occupationally they are trained in drawing inferences: diagnosis is the fine art of medical sleuthing. Philip Anderson, Dean of a Medical School, had commented earlier that fictional murder has an important place in medical education. For the physician as well as for the student, imagined crime and its solution has heuristic, recretional, and literary value. Needless to say the Sherlock Holmes Canon is an important textbook for these purposes.

PARALLELISMS IN MODERN LIFE

The modern case of the strange erasures in the Nixon tapes detailed in *Time* magazine is reminiscent of the Sherlockian case of *The Three Students* in which examination papers left behind locked doors had been disturbed. Fortunately for the solution of this case, pencil shavings and black doughy pellets were on hand. Unfortunately, recorder tapes do not leave shavings or other signs of tampering.

There is currently a concentrated effort to prove that the late President Kennedy was killed by more than one bullet. This is reminiscent of the many studies which attempt to determine the site or sites of Dr. Watson's Maiwand bullet wound(s). According to his own account in *A Study in Scarlet:* "There I was struck on the shoulder by a Jezail bullet, which shattered the bone, and grazed the subclavian artery." Later, in the *Sign of Four,* he tells us, "I made no remark, but sat nursing my wounded leg. I had had a Jezail bullet through it sometime before...." In another connection Holmes describes Watson as a half-pay with a damaged tendon achilles. The facts then are that Watson tells us in one place that he was struck on the shoulder and in another the bullet passed through his leg. It is clear that there was only one bullet, but Baring Gould, a famed Sherlockian, asserted that Watson may have received a second wound while engaged in the well known affair of the Vatican cameos. Thus, as in the present day counterpart, the argument may go on and on, even to the point of maintaining that Victorian modesty prevented Watson from mentioning the taboo expression "leg" in the first account and only mentioned it after a decent interval.

One of the problems which has engaged my attention for a long time is the matter of the red light (lamp). In the Victorian Era, the Red Lamp (See Doyles's *Round The Red Lamp*) on a house indicated that it was the home or office of a physician or, as told me by Dr. Radhill, served as beacons to those in need of help. How did the identification — red light — get transferred from medical men to participants of Mrs. Warren's profession? And when?

SHERLOCK HOLMES AND AMERICA

It is important for the Section on Medical History to have a discussion on Sherlock Holmes and Doctor Watson before its august body because certain American cities and states had a profound influence on them. It is only necessary to state some facts briefly since more elaborate discussion is on the schedule. One need only mention the inspired use of the Molly Maguires of the Pennsylvania coal regions, under the title of Scrowers in the

Valley of Fear, and of the Mormon Church in *Study in Scarlet*. William Smith (Associate Conductor to the Philadelphia Orchestra) had definite proof that Doctor Watson fought, not in Maiwand but in the Civil War battle of Gettysburg! But these items are not, strictly speaking, medical. There is definite evidence, according to Baring Gould, that Holmes visited Philadelphia — in *The Further Leaves of the Copper Beeches* William H. Miller puts his address as 321 B N. 6th St. — and the late Carson Simpson, a Philadelphia Sherlockian of note, traced an obscure possible connection of Holmes to Stephen Girard. He visited Philadelphia medical schools, although not as a medical student, and Eakin's *Gross Clinic* has a person in the background who resembles Holmes. This is probably correct since Watson's Pub, undoubtedly established near Thomas Jefferson University School of Medicine, holds the pair in high esteem.

SUMMARY

In this long introduction I believe I have established that the value of the Sacred Canon of Sherlock Holmes and the writings about it are valuable sources of reference material involved in Medical History. Certainly they afford the physician-historian a source of happiness, heuristic effort and history. According to Philip Anderson:

> Doubters may note that detective fiction not only reported new developments in science, but the stories actually anticipated developments and suggested innovations. For example, Sherlock Holmes discussed a test for human blood, the classification of tobacco ashes, and the preservation of individual foot prints before the law courts had accepted this new evidence. Generally detective stories have maintained stronger links to the practical science in law, criminology and science than to the humanities in literature and esthetics.

United States Place Names and Sherlock Holmes

By RICHARD FOSTER*

It is difficult for us to comprehend the 19th century of Sir Arthur Conan Doyle. We imagine that remarkable period, which ended so dramatically and so suddenly in "the most terrible August in the history of the world," to quote Dr. Watson, as an epoch in which war was ever far removed, merely an adjunct to foreign policy; a time when "the white man's burden" was a way of life, and other people were "lesser breeds without the law," as Mr. Kipling put it.

In such an atmosphere, how could Conan Doyle learn anything of American geography and place names? Even today the history of North America is but a footnote in the teaching of British history, and Doyle was born in 1859. After going to a proper school he entered the Medical Department of the University of Edinburgh, aged a mere 17, in 1876, becoming a Bachelor of Medicine in 1881 and a Doctor of Medicine in 1885. In none of this would one suppose any emphasis on American history and geography. He had no first hand knowledge of the United States when he published his *Study in Scarlet* in 1886.

There are clues however. Doyle himself tells us he was, in his boyhood, devoted to Dupin, that fantastic creation of the American Poe. And there seems little doubt that Sherlock Holmes was a namesake of Oliver Wendell Holmes, the world-renowned medical teacher and literary figure, American to his fingertips. Oliver Wendell made his triumphant tour of England in 1886 (the year of the creation of the *Study in Scarlet,* the first of the Holmes-Watson saga). During this hegira he received honorary degrees from Cambridge, Oxford and, significantly, Edinburgh. Conan Doyle wrote later: "Never have I so known and loved a man whom I had never seen. It was the ambition of my life time to look into his face, but by the irony of fate I arrived in his native city just in time to lay a wreath on his newly turned grave."

Perhaps the most obvious clue is one that is seldom if ever stressed in American history or in the opening of the West: English money. England was the world's banker in those days. How many Americans financed their railroads, their mines, their ranches and a hundred other businesses with British captial? There were many Englishmen who knew their United States and such men, as well as men of political power, were by no means unknown at the Doyles' dinner table in Sir Arthur's boyhood. Such men and their far flung interests surely fired a romantic boy's imagination. And so perhaps when the creative artist in Doyle came to the fore, he turned naturally to scenes that seemed, no doubt, to him as far away as Saturn does to us. But to have romantic notions about far away places does not mean a sound comprehension of place names and geography.

There is an interesting contrast between Doyle, the acute medical diagnostician, and Doyle, the creative artist. His medical associates remarked on the former. For example, Dr. Doyle said to a mother of a listless child, "You must stop painting the child's crib." His associates were amazed at the swiftness and, as it turned out, the accuracy of the diagnosis. The explanation, as Sherlock Holmes would say, was simple. Dr. Doyle observed: "The child looked pale but

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well-fed. He was listless and his wrist drooped as he tried to hold a toy. The mother was neatly dressed, but she had specks of white paint on the fingers of her right hand. Children like to sharpen their teeth on the rails of a crib — so lead poisoning seemed a likely diagnosis." But of artist Doyle, he himself observed, "I have never striven for it [i.e. for accuracy of detail in his stories] and have made some bad mistakes in consequence. What matter if I held my reader?" What matter indeed!

Consider, for example, the description of the Great Plains of Nebraska in *Study in Scarlet* — "an arid and repulsive desert." Doyle obviously has the Mormons in Arizona or New Mexico en route to Utah, hundreds, if not a thousand miles off the actual course.

One of my favorite passages, a few brief lines, is a conversation between Holmes and Dr. Watson in which Holmes observes, "the name (Lone Star) which is given to one of the states of the Union." "Texas, I think," says Dr. Watson. "I was not and am not sure which," replies Holmes. Such condescension! Sherlock, who on his own account could never let details hang uncompleted, so to speak, could have verified this in one of his innumerable encyclopedias and source books. It is also an amusing sidelight on Doyle the creative artist. This passage is like those grace notes in Mozart: the music will trot without them but it is better with them. So with these remarks, the story is better with them whatever they reveal of Doyle's knowledge of place names.

One of the most precious gems from our text is a remark by Hattie Doran, a tough girl posing to Sherlock Holmes as an exfrontierwoman. "We camped," says she glibly, "near the Rockies." This blows the mind of any one who knows first hand the majesty, the grandeur and the vastness of those magnificent mountains. I can hear Hattie saying to an admiral, "I sailed near the Atlantic Ocean." The Ocean reminds us of Atlanta, Georgia, both mentioned in the holy writ. The state was named, of course, for King George the Second, but Atlanta was named by some one who went not to Cambridge nor Oxford nor even Edinburgh. This ignorant person invented this name on the fanciful idea that it was the feminine of atlantic.

Besides Georgia there are 15 other states which occur in the saga of Mr. Holmes and Dr. Watson, and besides Atlanta, 20 other United States cities or towns. Careful study does not reveal a fixed pattern except for the fact that not a single New England place name occurs: Middle Atlantic, the South, the Middle West, the West, the Far West and the Southwest all provide an abundance of scenes and names.

Of the 16 states, six have names of Indian origin; four of what I might call English Latin, i.e.,Pennsylvania, the Carolinas and Georgia; four of Spanish origin; and New Jersey, the sole English one. New Jersey was the home of Irene Adler, who was certainly one of the best exports of that state. One state has a fanciful name Montana, which is neither Spanish nor Latin and does not mean mountain. It is in fact a name forced on that part of the world by a perservering politician and is a demonstration of the triumph of one man over bureaucracy.

Of the cities and towns, five have English names, four French, three are invented, two are Greek-Latin combinations, two are Indian, one is Dutch, one is Carib and one is from the Ancient World. I cited Atlanta as an invention. The other towns are Salt Lake City, of obvious origin, and Nauvoo, Illinois. Nauvoo was the product of Joseph Smith's fertile imagination. Before this it was known as Commerce, so dubbed by completely unimaginative yankee land speculators. No one knows what Nauvoo means. It was here that Smith was murdered, and it was from here that the Mormons set out in 1847 on their

great trek to Utah.

The captain of the brig *Lone Star,* a name referred to above, was on his way to Savannah when his ship was lost at sea, and just retribution never overtook him. Savannah is of Carib origin, now part of the English and, I suppose, the Spanish languages. It is perhaps one of the last vestigial traces of these warlike people.

The two cities which interest this audience the most are of course Philadelphia and Lebanon, Pennsylvania, USA, as the latter is designated by author Doyle. Philadelphia is mentioned a number of times in the story *The Valley of Fear,* which is based on the incidents of the Molly Maguires in Pottsville, Pennsylvania, in the 1870s. And in *The Adventure of the Copper Beeches* Miss Rucastle is reputed to have gone to Philadelphia. Oh, fortunate Miss Rucastle.

But the puzzle in the place names used by writer Doyle is that of Lebanon, Pennsylvania, USA. How could he have selected this obscure town as the home of Ezekiah Hopkins, founder and benefactor of the Red-Headed League? The fame of this place was hardly such that it was a focal point for discussion in the chancellories of Europe. I have a theory.

Doyle did creditable if not profound research when he wrote *The Valley of Fear,* the place names of which could be an essay in themselves. He must have examined a map of southeastern Pennsylvania and the name Lebanon stuck in his mind. Lebanon, by the way, is a name transmuted into its present form from an ancient name and through Greek, Latin and Arabic became the word we now know.

But there is another clue to this choice by Doyle and it lies with Rudyard Kipling. Kipling must have had a slight love affair with Philadelphia and with Pennsylvania for he wrote two short stories about Philadelphia, its people and its hinterland and a rather prescient poem entitled "Philadelphia." Those who recall their Kipling will recall *Brother Square Toes* and *A Priest in Spite of Himself,* in which Puck asks Pharoah to "go on with his adventures in Philadelphia." So Pharoah begins, "I left Red-Jacket and Cornplanter when I reached Lebanon." And these stories and this poem are just the kind of writing which the romantic Doyle would like, so permit me to quote the last stanzas of it:

> If you're off to Philadelphia this morning,
> And wish to prove the truth of what I say,
>
> I pledge my word you'll find the plesant land behind
> Unaltered since Red Jacket rode that way.
>
> Still the pine-woods scent the noon; still the catbird sings his tune
> Still autumn sets the maple-forest blazing.
>
> Still the grape-vine through the dusk flings her soul-compelling musk
>
> Still the fire-flies in the corn make night amazing.
> They are there, there, there with earth immortal
> (Citizens, I give you friendly warning),
> The things that truly last when men and times have passed,
> They are all in Pennsylvania this morning.

It is this kind of country in which Lebanon lies. Surely this Nirvana, this Shalimar, this Shangri-la remained fixed in Conan Doyle's creative rather than his medical mind and rushed to the fore when he was writing *The Red-Headed League.*

In closing let me paraphrase Sir Arthur: I have never striven for it (i.e. accuracy of detail in his stories, and a good thing too, I say) and have made some bad mistakes in consequence. What matter if I held my audience? What matter indeed!

Thank you.

The Habit of Sherlock Holmes

By WILLIAM H. MILLER, M.D., F.C.A.P.*

Robin Winks in his interesting work *The Historian as Detective* notes (p. 193) that "...the historian psychologically reacts badly to anyone who says 'History tells us' for the historian knows that history tells us nothing: we must painfully extract every message from Clio, for she is mute."

The trend in recent years to accept the master detective Mr. Sherlock Holmes as a common "junkie" has done much to spread the fame of Dr. David F. Musto and his paper "A Study in Cocaine"; it greatly increased the personal fortune of Nicholas Meyer by virtue of his currently popular *The Seven Per-Cent Solution.* Both works are examples of the scholarship that can follow a too casual reading of the records of Dr. John H. Watson or, as Sherlockian scholars are wont to call them, "The Canons."

There may be some of you who still regard this compilation of case studies by Watson as only a collection of detective stories, really the work of an obscure English ophthalmologist, Dr. Arthur Conan Doyle. The truth, of course, is that Dr. Doyle acted only as the literary agent for his colleague Dr. Watson, who was indeed the recording historian (we do not say author, since this implies fiction or fabrication). Dr. Doyle, much like Mr. Holmes, exerted considerable influence on John Watson and was not above editing some of the canons to suit himself. Often these instrusions on Watson's records were subtle indeed and intended only to provide clues for those in the future who would seek the truth by the deductive method so well developed by Mr. Holmes.

Reference to Watson's migratory war wounds, the famous watch and key incident, his self-acknowledged experience of women of many nations on three separate continents, and his unwillingness to speak of his life before his association with Holmes are only a few of the many deliberately planted nuggets, planted that the curious might dig further and explore the life of this famous physician. Further, such hints and clues to unsolved problems in the life of Holmes are numerous and touch on every facet of his life. Certainly, the number of existing societies devoted to the study of Mr. Holmes indicates how much there is to study. The occasional deliberate error introduced into the Canons by Dr. Doyle can be interpreted only as an example of the same shabby treatment that Holmes himself would visit upon Watson from time to time. Calling John Watson "James" (in *The Man with the Twisted Lip*) is such a deliberate error and obviously made by someone other than Watson's wife, who presumably knew his name.

But Watson was always the gentleman and loyal friend. His obvious dislike of Doyle resulted in the exclusion of Doyle's name from any of the canonical writings. He excluded him rather than make unpleasant reference to him, and this surely attests to Watson as a gentleman. As for Holmes, the Canons are repleat with the many evidences of Watson's devotion. Despite the rebuffs he would receive from Holmes on occasion, Watson never failed to leave his wife and the

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practice of medicine to accompany his friend on time-consuming and dangerous missions.

Because of this staunch loyalty it seems surprising that Watson would exercise such poor ethics and talk so openly (albeit erroneously) about Holmes's alleged use of narcotics! One wonders whether Watson carried the requisite $100-300,000 malpractice coverage. But again, understanding the Canons dictates that we examine all the evidence to see if this was considered such a disgrace.

In 1858 Albert Niemann, a pupil of the famous organic chemist Woehler, isolated cocaine; but the important physiologic and pharmacologic properties of cocaine remained unknown for years. It was not until Karl Koller, a young Viennese physician, published his paper "On the Use of Cocaine to Anesthetize the Eye" in 1884 that the significance of the drug became clear to others. The following year, Sigmund Freud attempted to relieve the pain of tic douloureux by injecting the trigeminal nerve with cocaine. He was unsuccessful with his experiment. Before long Freud had himself acquired the cocaine habit, which he is said to have had until at least 1895.

In the same year that Freud tried injecting the trigeminal nerve, the famous American surgeon William Halsted was successfully injecting nerves, but he too became addicted to cocaine. The distinguished William Henry Welch, father of American pathology, hired a schooner and, together with three sailors and Halsted, slowly sailed to the Windward Islands and back in order to keep Halsted away from cocaine. This effort was not successful, but Halsted apparently gave up the crippling habit on his own later. It was not until 1969, on the occasion of the eightieth anniversary of the opening of Johns Hopkins, that a secret journal by Sir William Osler was read for the first time. In it Osler revealed that Halsted had cured his cocaine habit by turning to morphine. William James was said to experiment with drugs, but he warned that although drugs bring "man from the chilled periphery of things to the radiant core in their totality...[they are] a degrading poison." It would appear that a later successor at Harvard, Dr. Timothy Leary, failed to heed this warning.

But doctors were not the only ones who used cocaine at this time, since it was easily available in pure form and present in many patent medicines. For years Pope Leo XIII was a user of Mariani wine (as were Gounod and Massinet), a red wine laced with cocaine hydrochloride. The ordinary mortal had to content himself with Coca Cola, which contained cocaine until 1903. It is estimated that prior to the passage of the Harrison Narcotic Act in 1914 there were twice as many women addicts as men because of the easy availability of proprietary medications that contained narcotics and which were used for the relief of "female complaints." Nor were children free from the evil. Jane Addams, the social worker, in her work *The Spirit of Youth and The City Streets,* tells of children and adolescents who pawned their clothes and shoes to buy cocaine in the streets of Chicago in the first years of this century. Things were indeed different, for agents of drug stores would sell to these children, and twenty-five cents bought a "fix" of cocaine. The use of these drugs was equally well established in Europe and in London of the 1880s, when Watson first met Holmes. Holmes's association with the criminal element and the people of the street would have given him first-hand knowledge of the evils of addiction and certainly would have deterred a man of his intellect from the use of drugs.

Having examined the times, let us examine the symptoms. Professor Koelle, in his excellent paper *The Poisons of the Canon,*[1] accepts without question Holmes's use of

cocaine and dismisses it as a confirmation of "his very humanness." The following descriptions of cocainism should put this casual appraisal of humanity in its proper place.

Writing at around the turn of the century, two prominent Philadelphia physicians, H. C. Wood and James Tyson, added their descriptions of the symptoms of cocáine addiction. It is to be remembered that as in Chicago in the early nineteen hundreds, cocainism was common in Philadelphia, and both writers (professors at the University of Pennsylvania) had considerable experience with this illness. Dr. Wood[2] noted that addicts manifest "...dreaminess, apparent inability to attend to the ordinary duties of life, loss of reliability, promptness, and punctuality, varying mental aberration suggesting, but different from that of paranoia, occurring in a case should arouse suspicion." Tyson[3] noted that "the effect is a total demoralization of the individual, who loses all moral responsibility, delaying and neglecting appointments in the most remarkable manner. There is volubility of tongue, suggesting alcoholism, and the presence of hallucinations, which also resemble those of the alcoholic effect." Noyes[4] states, "Frankly psychotic symptoms are common among those who continue the use of large doses of cocaine over a prolonged period." He ends his description of this affliction by adding, "the moral deterioration in the cocaine addict is even greater than the morphine habitue." In Osler's textbook[5] the observation is made that "the subjects often are of the 'neurotic class.' " In the same description it is pointed out that "the moral degradation often is greater than from morphinism, and the chance of ending the habit is less." Glaister[6] remarks that "in addition to the signs of physical degeneration, which are apparent, addicts frequently suffer from psychical degeneration which commonly assumes the form of insanity." Barr[7] continues this unhappy recital by noting, "not infrequently true insanity develops." Mathison,[8] in his delightful account of drugs, states that Holmes, "who apparently 'joy-popped' with cocaine...was using one of the few drugs which definitely inspire criminal actions." Note his use of the word "apparently." A final word from the classical textbook of Goodman and Gilman[9] will conclude this gloomy picture. These authors note that "the cocaine addict is not a normal individual but is often a dangerous and debased person."

The above descriptions concern the effects of long-term usage. Certainly "three times a day for many months" (*The Sign of Four*) would constitute such usage. What of the immediate action of this drug? The subjective symptoms appearing after its use are those of cerebral cortical stimulation and are "manifest in garrulity, restlessness and excitement. There is some evidence that mental powers are increased."[10] Stimulation is then replaced by depression, with the higher centers first depressed. Larger doses result not only in cerebral stimulation but also in the stimulation of lower centers, so that tremors and convulsive movements appear.

The descriptions of both the immediate effects and long-term use of addiction prompt a search of the Canons for evidence of these effects. The character of Holmes should dispel immediately a belief in his addiction, for no one could consider him a debased person or moral degenerate. Further, there is no evidence that he was hypochondriacal or neurotic. Indeed, the facts are all in opposition to such a notion! Furthermore, the treatment for addiction is complete withdrawal from the drug, and this results in "severe depression and delusions [which] may persist for several weeks."[11] Despite Watson's assertion that he "had gradually weaned him from that drug mania" (*The Adventure of the Missing Three-Quarter*), there is no evidence

for the aftermath of such treatment. The immediate effects of cocaine stimulation should have been apparent in Holmes's conversation with Watson and the interview with Miss Morstan which took place following his use of a hypodermic alleged to contain cocaine (*The Sign of Four*). The symptoms are not apparent, for Holmes conducts himself without evidence of increased psychomotor activity. It seems hardly possible that his already brilliant faculties could be enhanced by a dose of cocaine sufficiently low to fail to produce the concomitant symptoms.

What suggestions or proof do we have of the master detective's use of this drug? There is a Watsonian reference in the Canons to Holmes's "alternating from week to week between cocaine and ambition" (*A Scandal in Bohemia*); canonical scholars place this in the year 1886. Another reference (*The Yellow Face*) notes that "save for the occasional use of cocaine...[Holmes] had no vices." No one uses cocaine occasionally! This was in April 1888. The chief suggestion, too easily considered a proof, is Holmes's own words that he was using cocaine in "a seven percent solution." Consider Watson's question that prompted this statement, "Which is it today...morphine or cocaine (*The Sign of Four*)?" Since the incident occurred early in their acquaintance, such a question posed to an English gentleman may easily have been construed as cheek and worthy of a calm rebuff. The question as to whether Holmes used morphine seems hardly worth consideration in view of the symptomatology and marked deterioration produced by the continued use of this drug.

What, then, was in the syringe? The British Pharmacopoeia of 1885 does not list cocaine as suitable for injection. Quain's medical dictionary[12] of that era lists only four drugs "used hypodermically." These were morphia (morphine), atropia (atropine), ergotine, and quinine. The present day list of injectable medicaments is so long that only actual chemical or biological analysis of the contents of a syringe could establish the nature of the material; but, with only these four drugs to choose from, it should be relatively easy to pick the correct one. Morphine has been excluded. Ergotine is used in obstetrics and in the treatment of migraine. While Holmes may have had his headaches, they could not be described as migrainous, and his interest in obstetrics was more that of the entrepreneur than the accoucheur. Quinine is rarely used by injection since such injections are quite painful and may product a slough of the tissues. This leaves only atropine. Young Stamford, the dresser under Watson at Bart's, noted that Holmes could give "a friend a little pinch of the latest vegetable alkaloid, not out of malevolence, you understand, but simply out of a spirit of inquiry in order to have an accurate idea of the effects. To do him justice, I think that he would take it himself with the same readiness" (*A Study in Scarlet*). This attests to Holmes's interest in experimental pharmacology and may indeed suggest that such experimentation with alkaloids had been in progress, possibly with himself as an experimental subject. Watson, in his summation of Holmes's various abilities speaks of him (Holmes) being "well up in belladonna, opium and poisons generally" (*A Study in Scarlet*). Such a knowledge would certainly deter Holmes from the use of narcotics and further suggests a particular interest in belladonna and its derivatives. In the same summation, Watson describes his friend's knowledge of chemistry as "profound." A profound knowledge of chemistry and a special interest in belladonna would have given Holmes the advantage of knowledge not ordinarily possessed by a general practitioner of medicine. The Solanaceae or nightshade family of plants yield many alkaloids valuable in medicine. *Atropa belladonna* was the first of the

atropine-yielding Solanaceae. In the early 1860s alcoholic tinctures of this plant were introduced as anodyne or sedatives by Peter Squire, a London pharmacist. Much earlier, in 1589, Porta, a surgeon of Naples, produced insensibility by making patients inhale the vapour of an essence made from hypscyamus, solanum, poppy, and belladonna. While nightshade yields l-hyoscyamine, atropine (racemic hyoscyamine) and scopolamine (hyoscine), the shrub known as henbane has a greater yield of scopolamine. Of all the belladonna series, atropine and scopolamine are the most important.[13] Interestingly enough, there is a close chemical similarity between atropine, scopolamine, and cocaine.[14] In the mid 1890s scopolamine was used in the treatment of cocaine and morphine addicts. Later, in 1903, von Steinbuchel, working in Austria, produced the dammerschlaf (twilight sleep) in obstetrical patients by the use of scopolamine.[15] It is entirely possible that Holmes, in his study of the belladonna series of drugs, may have come across scopolamine. As Holmes worked with this drug, its interesting pharmacologic properties undoubtedly came to his attention. The fact that scopolamine has both sedative and tranquilizing effects may have induced its use and made it especially appreciated at such times when Holmes was between cases and suffered from ennui. It is entirely conceivable that, while experimenting with doses of this drug and noting its various influences in combination with other drugs, Holmes discovered one of its more surprising properties. When scopolamine is administered with other sedative drugs, a state of deep sleep similar to unconsciousness is usually produced. During such a state, questions put to the seemingly unconscious subject are often answered with surprising truth and accuracy. Following this narcosis, there is complete amnesia for the events taking place during this period. Imagine the delight, then the regret, Holmes must have experienced when he realized that the method of interrogation he had discovered would be as valuable to criminals as it would to police. Secrets could easily be wrested from abducted government workers, and blackmailers would have a weapon that would make the nefarious Baron Gruner little more than a Peeping Tom. Then, too, Holmes knew that testimony secured from unwilling suspects under the influence of this drug would probably not be admissable evidence in the courts and might well put the police in the embarrassing position of having been guilty of assault.

These are reasons valid enough for Holmes to discontinue his researches; but surely the most important reason of all must have been the realization that such a drug and its use might end the science of deduction in criminology. So the experiments were dropped and, perhaps because he feared that Watson was not to be trusted with this knowledge, Holmes went through the pretense of being "weaned" from a drug habit. Not until 1922, when Dr. E. House[16] reported the first case of criminal interrogation under scopolamine, did the method come to the attention of the police and later the general public.[17] One of the very problems Holmes anticipated immediately arose — that of assault and involuntary confession. The arguments for and against continue, and Depres[18] in 1947 noted that "if a State Court admitted such a confession, the United States Supreme Court would reverse the conviction under its decisions that use of a coerced confession is not due process of law."

In conclusion, there can be no doubt that Mr. Sherlock Holmes was not addicted to narcotic drugs. There is no real evidence to support such a belief, and the facts are all against it. A knowledge of the man himself and his abilities, as well as the few drugs available for hypodermic injection during the

times of Holmes experimentation, have made possible the elementary deductions that lead us to the true contents of his syringe.

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Sherlock Holmes, Father of Forensic Pathology*

By MARVIN E ARONSON, M.D.†

Fellows of the college, and guests, please permit me to thank you for the privilege of speaking to you tonight and to apologize for the fact that most of the material I had intended to cover was already covered by the previous speakers. Fortunately, being the last speaker, I have not an obligation to speak till a given time, and, therefore, will not bore you will repetitious material which you have already heard. As a result, I shall not discuss many aspects of medicine which appear in the Canon, such as the mention of the development of the Bertillon system for classification of the shape of ears, and facial appearances as they differ from trade to trade and personality to personality, nor will I discuss applied psychiatry, as described in the *Valley of Fear,* to cure the melancholy of Mrs. Douglas over her apparent bereavement, nor even applied psychiatry as utilized in the adventure of *Wisteria Lodge,* or the *Retired Colourman.* I will not delve into such medical mysteries as the cure of chloroform intoxication by the intravenous administration of ether in the adventure of *Lady Frances Carfax,* nor even the distinction between psuedoichthyosis (a lovely word) and leprosy, nor the efficacy of paregoric as a therapy for prevarication, nor will I touch upon such matters as sibling rivalry as expressed in the *Sussex Vampire,* nor yet even the effects of weird hormonal preparations as described in the *Creeping Man;* nay, none of these will I discuss. However, I will discuss the evidence, with you, that Sherlock Holmes was in fact the "Father of Forensic Pathology."

Since we are to discuss the family affairs of the Master, it is only fitting that I touch upon some previously unpublished material concerning his ancestry. As most of you who are serious students of the Master will already know, there have been many studies on this subject with the Master being definitely associated with the French painter, Vernet, and a few other notables of the early nineteenth century. There are, however, two very notable figures whose personality and capabilities indicate that they must have contributed something to the ancestry of the Master.

I will speak first of Brigadier Gerard. The many tales of Brigadier Gerard, have been amply recounted in print, oddly enough, by the same person who stole the manuscripts of the Holmes adventures from Doctor Watson, namely Sir Arthur Conan Doyle. We should be generous, however, and trust the accurate reporting of Doyle, in this instance. Gerard had many adventures while serving under Napoleon, and he recalled these in his later years while maturing among the French vineyards whose product he loved and consumed, occasionally to excess. It is of particular note to us, as Philadelphians, that the Brigadier surely was a long lost brother of the orphaned Steven Girard, who emigrated to this area from France and contributed so much to the development of the city and its trade. Suffice it to say, the Brigadier, who was never allied in marriage, had numerous romantic adventures. (By his own humble

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admission, we know that the girls could barely resist his charm and manliness.) It must have been during one of these romantic interludes, not specifically chronicled by Doyle, that the genes for astute observation and rapid synthesis of information were passed on, to show up later in the person of the Master.

Another source of these same qualities, tempered with a strong sense of justice and human values, must have been another figure of the same era, whose adventures have been chronicled by C. S. Forester and whose definitive biography was produced by the eminent scholar C. Northcote Parkinson. I refer, of course, to Admiral Sir Horatio Hornblower. Those of us with a nautical turn of mind who have studied the life of this prominent sailor must agree that his great analytical abilities must have been passed on to the Master, although the details of the connection await further research.

I will not mention to this illustrious and interested audience the fact known to all serious students of the Canon that, so far as progengy goes, the modern detective, Nero Wolfe, purportedly a fictional creation of Rex Stout, was no doubt the illegitimate son of the Master by Irene Adler. One has only to compare the physique of Wolfe with the physique of Mycroft Holmes to draw the obvious conclusion and attribute to Ms. Adler the wisdom which she exercised when she refused to burden the Master with the task of raising their son. Perhaps she was also somewhat of an Anglophobe and preferred to have Nero contribute his energies strictly on the "colonial" side of the waters.

Enough of the geneology of Holmes. We are assembled here to consider the evidence that the Master in fact began the science of Forensic or Legal Pathology, also known as Death Investigation.

The very first words which Doctor Watson ever heard Sherlock Holmes speak are, "I've found it! I've found it, I have found a re-agent which is precipitated by hemoglobin, and by nothing else." These words, which appear in *A Study in Scarlet,* indicate that the Master was working actively on a problem which still intrigues the forensic scientist as he investigates the scene of the crime. To distinguish stains caused by blood from other materials of similar color is still a challenge to death investigators. Nowadays it is possible to distinguish between blood of various species by the use of suitable serological re-agents, and to determine the blood type of stains, but these techniques have only relatively recently been developed. It is highly significant that the early interests of the Master were directed toward this problem.

The timing of wounds relative to the time of death is also a problem still confronting the practitioners of Forensic Pathology. An interesting modern case occurred in Philadelphia, prior to the establishment of the Medical Examiner's Office. This case, which received much publicity, dealt with the importance of knowing "how far bruises may be produced after death." This is the very problem which the Master was attacking when he was observed by young Stamford "beating the subjects in the dissecting-room with a stick," as detailed by Stamford in *A Study in Scarlet.*

In this same account we see revealed an extensive knowledge of alkaloids and perceive that the Master anticipated the development of one of the most powerful tools in modern analytical chemistry, the gas chromatograph, which is merely a mechanical-electronic means of detecting odors. He identified the cause of death as poison when he merely "sniffed the dead man's lips." The Master had obviously trained himself to a high degree on the perception of odors by using the natural equipment rather than the more expensive mechanical devices.

Another interesting aspect of the same adventure comes to light when we find out that Jefferson Hope, desiring greatly to be avenged for the death of his beloved Lucy Ferrier, but not desiring to consider himself a murderer, takes advantage of the fact that he has had some training in Pharmacology and prepares sets of identical appearing "pills," one of which contains an alkaloid poison, the other being harmless. He then forces the victims (or more accurately, to his way of thinking, the murderers) to choose one pill and swallow it while he swallows the remaining one. All of this is revealed when the Master, obtaining a set of the pills, performs a cheap and very informative experiment. The suspect pills are fed to a poor terrier which Doctor Watson had been requested to "put out of its pain." The dog survives the effects of one pill but quickly and painlessly dies from the effects of the other pill, thus demonstrating the method by which Jefferson Hope forced "justice" upon his victims.

Thus, the Master, in one adventure, utilizes the advanced analytical techniques of gas chromatography, in a portable and cheap form (namely his natural nose) to define the cause of death and then, by another remarkably cost efficient experiment, clarifies the manner of death as well.

We cannot leave the adventure involving Jefferson Hope without touching on another disease which is almost completely within the realm of the Forensic Pathologist or death investigator. Three or four times a year we are challenged by the presentation of a case involving a tall, slender person who has died suddenly while relatively young, without obvious signs of trauma or disease. We observe the long fingers and toes, even longer than is usually associated with the slender habitus and conclude that the patient probably had "Marfan's Disease" and died as a result of rupture of an aortic aneurysm. We are able to thus assure the police that they may safely suspend any murder investigation until we confirm this diagnosis by autopsy. When the confirmation is obtained we can talk with the family concerning the congenital and hereditary aspects of this disease. Doctor Watson provides us with an excellent description of the process of the development of the aneurysm in the tall but powerful Jefferson Hope. However, he does not correct the misimpression that Hope has (attributing his aneurysm to the many weeks of wandering over the plains of the western states), because there are no survivors or family to counsel.

A second adventure in which the Master anticipates some of the tasks of modern day Forensic Pathologists is the one involving *The Lion's Mane.* In this adventure the local police are baffled by death which is in fact produced through the pain of the stings of a sea animal, called in the account, CYANEA CAPILLATA, but in fact popularly known as Portuguese-man-of-war. This sea creature has very long, delicate tentacles which extend from its jelly-like body, which floats on the surface. The tentacles are studded with cystlike structures which, when touched, discharge a stinger which injects a very powerful toxin. The toxin has other effects on marine animals, but is capable of producing such severe pain in humans as to precipitate cardiac arrythmias, especially in patients with impaired coronary artery circulation. This jelly fish continues to present problems to the Forensic Pathologist even in modern times because of the frequency with which older persons, either visiting or living in the warm climates, go ocean bathing and collapse (frequently while reciting the mysterious incantation "Ahhs' michieh"). The collapse can be due primarily and exclusively to the presence of natural disease, or exclusively to the occurence of the stings, or to a combination of both of these. It is mandatory for the death investigator to determine the presence or absence of both the diseases in

order to properly prepare a death certificate which can be fair and useful in the settlement of insurance claims or other litigation. The natural disease can be detected easily by autopsy, but the stings are another matter. Even though there are wheals on the skin, these may be due to the effects of dragging the victim from the surf and scratching the skin on the rough sand or objects buried in the sand. The question of the presence or absence of stings is solved nowadays by the rather simple expedient of rubbing the surface of the body where the wheals appear with the forearm of the examining pathologist (or any other gullible volunteer). The result, if the wheals are in fact due to stings, is that many previously "unfired" cysts will fire into the arm of the examiner and produce the characteristic wheals and great pain, thus confirming the diagnosis of Man-of-war stings. Since this involves great pain to the examiner, it is best done at the end of the working day, after the post has been done so that the pathologist can repair at once to his home and ingest suitable flavored, carbohydrate analgesics. (Martinis are suggested by those who practice the art in Florida.)

However, in *The Adventure of the Lion's Mane* the Master, being more intelligent than most pathologists, succeeds in having someone else in the adventure suffer the stings, not only confirming the cause and manner of death, but also clarifying the location of the offending animal.

Thus by citing a few adventures from the Canon it should by now be accepted that the Master was in fact the "Father" of the modern science of Forensic Pathology, and in fact such skilled practitioner of the art that he did so without budget. He successfully exploited the most simple and cheapest methods for confirming his brilliant conclusions. Would that he were still available to guide us in our more mundane activities which do require such crass things as budgets.

Medical Botany in the Ohio Valley (1800-1850)*

By RONALD L. STUCKEY, Ph.D.†

The use of plants in medicine was of vital importance to the people living on the western frontier of the United States during the first half of the nineteenth century. America's frontier, the Ohio valley, was the pathway of migration of the people on the east coast of the United States as they moved westward, clearing the land and building homesteads. Because of its geographical position, its terrain and fertility of soils, and its internal and bordering waterways, the Ohio valley was an area where various social cultures began to intermingle. With this intermingling came differences of opinion and conflict, resulting in wars with various Indian nations, political battles, and religious controversies. And so it does not seem unusual that in the Ohio valley there were also differences in the medical profession.

MEDICAL SCHOOLS IN THE OHIO VALLEY

Two basic schools of thought in medical education developed in the Ohio valley during the first half of the nineteenth century. The physicians of the regular or allopathic school believed primarily in the use of mineral and chemical preparations of calomel and mercury and in the practice of bloodletting. In addition, they possessed an impressive knowledge of the use of plants in the preparation of their medicines, the materia medica. The major and well-established medical schools of this philosophy were on the east coast, such as those at the University of Pennsylvania, Jefferson Medical College, and University of the State of New York; and those that developed in the Ohio valley, principally the medical department of Transylvania University at Lexington, Kentucky, the Medical College of Ohio and the medical department of the Cincinnati College, Cincinnati, and the Louisville Medical Institute at Louisville, Kentucky. In these western medical schools, materia medica and scientific botany flourished principally in the Cincinnati schools in the 1820s and 1830s under the leadership of Dr. Daniel Drake, in Lexington in the 1830s under Dr. Charles Wilkins Short, and in Louisville in the 1840s under both men.

Opposing the regular school of medical education and practice was the botanico-medical movement, or Reform medical practice, which stressed the materia medica, or the superiority of indigenous plant remedies, and disavowed the use of mineral and chemical preparations and the practice of bloodletting. Their philosophy differed from that of the allopathic physicians in attempting to substitute remedies less toxic than calomel, which remedies were usually made from plants such as lobelia, capsicum, and others. They, too, soon developed an impressive materia medica, but scientific or taxonomic botany did not become well-established. Instead of bloodletting, medicated enemas and steam baths were prescribed. The

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botanico-medical movement came in the 1820s and 1830s and soon developed several factions. Among these factions were the Thomsonians, later called Botanics, organized by Samuel Thomson. The Reformers or Eclectics emerged under the leadership of Dr. Wooster Beach and Dr. Thomas Vaughan Morrow, who established in 1830 the Reformed Medical College in Worthington, Ohio, which moved in 1844 to Cincinnati, where it was refounded under the name Eclectic Medical Institute. The Physiomedicals were established under the leadership of Dr. Alva Curtis, who founded at Columbus in 1839 the Literary and Botanical-Medical Institute of Ohio, which in 1841 moved to Cincinnati. In the Ohio valley the two latter medical sects appeared and grew, and from the Ohio valley their influence spread throughout the country. The Reform medical practice found progress difficult in part because the regular or allopathic physicians had already made so many valuable contributions to materia medica and scientific botany. In the Ohio valley the differences among the ideas of the several sects, as well as their differences with the allopathic physicians, were fought by physicians, both in private practice and in the medical schools, and by their publications in the medical journals.[1 2 3 4 5 6 7 8 9 10 11 12 13]

AN OVERVIEW OF THE PHYSICIAN BOTANISTS, MATERIA MEDICA, AND SCIENTIFIC BOTANY IN THE OHIO VALLEY

The study of plants in the Ohio valley in the first half of the nineteenth century was conducted principally as a labor of love by businessmen, school teachers, and physicians. Physicians in practice, unconnected with medical schools, studied plants and used the medicinal properties of plants. Among them were Dr. Samuel P. Hildreth, who in 1806 came from New England to Marietta, Ohio. He was one of the first resident physicians in the Ohio valley who had an interest in plants.[14 15] At Marietta, he spent his entire life in medical practice, wrote an early paper on the medical properties of the *Frasera carolinensis* or American Columbo,[16] and prepared an herbarium of the plants of the vicinity of Marietta. In the Cincinnati area, Drs. John Locke,[17] John Eberle,[18] and Jared Potter Kirtland[19] studied plants. At some place in their lifetimes these individuals were associated with one of the medical schools in Cincinnati, although not necessarily to give instruction in materia medica or botany. In Fairfield County, Ohio, southeast of Columbus, two physicians in private practice, Dr. John M. Bigelow[20] of Lancaster and Dr. Asa Horr[21] of Baltimore, studied the medicinal properties of the plants in their neighborhood and prepared a catalogue of the local flora.[22] Dr. Asahel Clapp[23] of New Albany, Indiana, chaired the committee on indigenous medical botany and materia medica of the American Medical Association for 1850-51 and published in 1852 a catalogue of the medicinal plants of the United States,[24] a book of considerable merit and importance in medical botany.

Most of the formal botanical training and instruction was conducted in the medical schools. As part of this training one must distinguish between materia medica and scientific botany, for such a distinction was drawn clearly by medical educators in the nineteenth century. Materia medica was the study of plants used in medicinal preparations. In his *Inaugural Discourse of Medical Education,* on the occasion of the opening of the Medical College of Ohio in 1820, Dr. Daniel Drake defined the study of materia medica as "...the facts and principles which relate to the operation of the various medicinal agents on the human body, both in health and disease, together with their natural

history and pharmaceutical preparation."[25 26] To him it was the "most important" component in the practice of physic, the application of the means of relief. Botany, by contrast, was the scientific study of plants, the learning of their names, their scientific description and classification, and information on their habitats, growth, and distribution. Botany, in this sense, usually lay outside the curriculum of the western medical schools. Again in his *Inaugural Discourse,* Drake said:

> We come now to sciences which lie on the outside of the group. Of these Botany is the most considerable. Its relations are chiefly with the Materia Medica, to which it contributes very largely, and in connection with which it has for ages been cultivated by medical men. In the infancy of our college, it will...not be made an essential study; but the means of prosecuting it will be provided, and in a general state of the Western Country there is much to recommend its cultivation to every practitioner of medicine.[27 28]

DR. DANIEL DRAKE AS AN INFLUENTIAL PHYSICIAN BOTANIST

Dr. Daniel Drake (1785-1852) was among the most prominent physicians of early nineteenth-century Ohio, known nationally as well as throughout the Ohio valley.[29 30 31 32] Born in New Jersey, he came with his parents at the age of two to Mays Lick, Kentucky. At fifteen he went to Cincinnati to become an

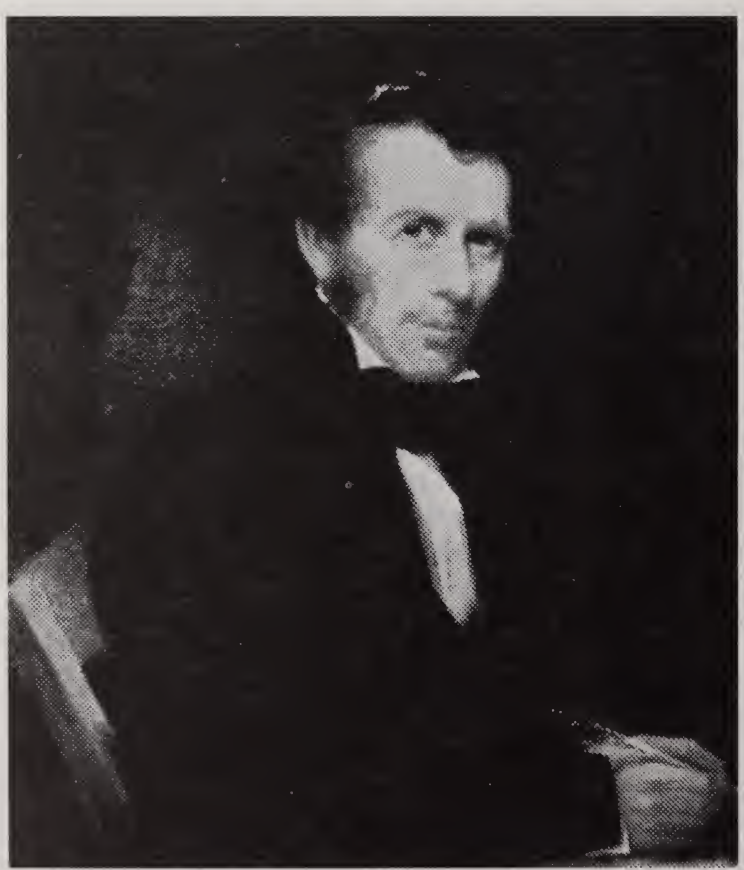

Fig. 1. Dr. Daniel Drake. From Horine, Emmet Field. 1961. *Daniel Drake (1785-1852): Pioneer Physician of the Midwest.* Philadelphia: University of Pennsylvania Press, between pp. 256-257.

apprentice to Dr. William Goforth. In 1805, he returned to the east to study medicine at the University of Pennsylvania, where he came under the influence of Professors Benjamin Rush, Caspar Wistar, Jr., and Benjamin Smith Barton. Barton, who was professor of materia medica, natural history, and botany, seems to have had a considerable influence upon Drake. In 1816, having obtained the M.D. degree, Daniel Drake returned to Cincinnati.

A man of many talents, Drake was a physician, teacher, writer, civic leader, scientist, and local politician. He was instrumental in the organization of schools and colleges, hospitals and clinics, libraries, a museum, and literary, scientific, and professional societies — many events that built and moulded Cincinnati. He was also one of the early botanists in the Ohio valley, his first botanical contribution appearing as a small section in his first book, *Notices Concerning Cincinnati,* prepared in 1809 and 1810, the first book published west of the Allegheny Mountains that gave some information on plants. The botanical information was in the form of a floral calendar which described the phenological progress (or flowering times) of selected plants in the Cincinnati neighborhood during the spring of 1809. In the appendix was a botanical description of the Columbo Root, *Frasera carolinensis,* with notes on its habitat, phenology, and medicinal properties. The root possessed considerable laxative power and therefore was potentially a better remedy than those already being used.[33] [34]

Dr. Drake published his second major work, *Natural and Statistical View, or Picture of Cincinnati, and the Miami Country...*, in 1816. Botanically it contained (1) a list of the native trees (61 genera and 102 species) growing in the Miami Country, (2) a review of the characteristics of two species of buckeye, one of which he thought was new to science and which he described under the name *Aesculus maxima,* (3) a list of 66 plants useful in medicine and the arts, noticing the part of the plant to be used and the medicinal property each plant possessed, and (4) a floral calendar. He also added a note about the *Frasera carolinensis,* repeating in part what he had written in the *Notices* and concluding that the plant possessed considerable "emetic and cathartic powers. As a medicine, it is perhaps equal to any of our native tonics."[35]

In 1813, Dr. Drake along with others organized a "School of Literature and the Arts" in Cincinnati. In the anniversary address of 1814, Drake pointed to the significance and importance of the study of botany.[36] [37] With the aquisition of his medical degree, notices of his lectures, and his writings on botany and materia medica, he was in 1817 elected to the professorship of Materia Medica and Medical Botany in the medical department of Transylvania University. This medical department was the first created west of the Allegheny Mountains in 1799. Efforts to activate the department from time to time failed until the fall of 1817, when all the chairs were filled and accredited courses began. Dr. Drake thus became the first professor of Materia Medica and Medical Botany.[38] In his valedictory address to the class of 1818, Dr. Drake expressed his own conviction of the essential role which specialized scientific training such as botany played in the education of a physician.[39] [40]

Dr. Drake's initial success in teaching at Transylvania University during the winter of 1817-18 made him ambitious to continue his lecturing on botany after he returned to Cincinnati. By an advertisement in the *Western Spy,* Drake gave notice that he would give botanical lectures. The introductory lecture was held on Friday evening, 8 May 1818, "at candle light in the First Presbyterian Church." Newspaper comment indicated that the lecture was of

much interest. Forty subscribers enrolled for this venture, the "...first attempt of its kind in the Western Country."[41] With others, Drake advertized to give medical instruction. Drake was to lecture on botany in the spring and summer and on materia medica in the winter. This venture began in November 1818 at the Lancasterian Seminary. Dr. Drake's ventures in medical education subsequently developed into the establishment of the Medical College of Ohio.[42]

These botanical writings and lectures were enough to make Dr. Drake the early leader of botany in the Ohio valley. But as he moved into other concerns and affairs, such as the founding of the Medical College of Ohio in 1819; the extension of his practice; the establishment of the medical department in the Cincinnati College in 1835; the editing of his influential journal, *The Western Journal of Medical and Physical Sciences,* from 1828 to 1838 in Cincinnati, and its successor, *The Western Journal of Medicine and Surgery* from 1840 to 1849 in Louisville, Kentucky; and lectures to his classes on the theory and practice of medicine, he was no longer at the forefront of classical and scientific botany, yet he never gave up his interest. Over the succeeding thirty years (1820-50) he reviewed in his journal several botanical works on the flora of eastern North America and the Ohio valley.[43] [44] [45] [46] He repeatedly encouraged individuals such as Dr. Charles Wilkins Short[47] [48] and Dr. John Leonard Riddell[49] [50] [51] to publish their studies on the flora of Kentucky and Ohio, respectively. Drake wrote briefly on the methods of the preservation of plants for an herbarium[52] and prepared a short history of botanical work in the Mississippi valley.[53] In this latter essay written near the end of his life, Drake continued to elaborate on a theme he repeated throughout his life — that of the necessity for young physicians to study the specialized sciences, particularly botany. He gave three reasons why so few physicians studied botany, but countered with seven reasons for pursuing this science. At medical conventions and in various lectures, he argued for more professorships in the natural history of medicines and botany.[54] In his early years, Dr. Drake prepared herbarium specimens, but the extent of his collection and its whereabouts, if it exists, is not known.[55]

DR. CHARLES WILKINS SHORT AS A SCHOLAR-PHYSICIAN-BOTANIST

Materia medica and scientific botany reached the height of its development and study in nineteenth century Ohio in the work of Dr. Charles Wilkins Short (1794-1863). A quiet, calm, modest, and dignified gentleman, he was a very industrious botanist and effectual promoter of botany in the United States through his teaching, writing, and correspondence with over seventy-five botanists.[56] [57] [58] [59] [60] Dr. Short was born in Greenfield County, Kentucky, in 1794, received a good primary education, graduated with honors at Transylvania University, and in 1815 took his medical degree at the University of Pennsylvania. Like Dr. Drake, Charles Wilkins Short was greatly influenced by the professors at the University of Pennsylvania, and especially by Benjamin Smith Barton with whom he studied materia medica and botany. After several years of medical practice at Lexington and at Hopkinsville, Kentucky, he was called in 1825 to the chair of Materia Medica and Medical Botany in the medical department of Transylvania University. From 1818 to 1827, Transylvania University was under the presidency of the great thinker and organizer, Dr. Horace Holly, and the medical department was greatly improved, now being the second largest in the nation. Dr. Drake had taught materia medica and botany in the winter of 1817-18.[61] By 1824 an herbarium of

Fig. 2. Dr. Charles Wilkins Short. From Davis, P. Albert. 1945. Charles Wilkins Short, 1794-1863: Botanist and Physician. *Filson Club Hist. Quart.* 19: opposite p. 144.

medicinal plants was part of the University's Museum.[62] As a practicing physician, Dr. Short began his studies in botany and correspondence with botanists. At Transylvania University he was in a position to build and strengthen these interests for the University and for himself. During the first two years he spent considerable time preparing his lectures on materia medica and medical botany. These lecturers were written out in full and read with a good voice and correct emphasis to his students. His style was chaste, concise, and classical, and his manner always grave and dignified.

By 1827 Dr. Short was actively studying the plants of the Lexington area in the field, and

during the decade to follow he diligently studied the flora of Kentucky, with emphasis on the preparation of herbarium specimens and the writing of papers. His publications on materia medica and botany number about twenty-five. These papers were thorough, well-written, and certainly represented the largest amount of published knowledge on scientific botany of the Western Country. Most of his papers were published in *The Transylvania Journal of Medicine and the Associate Sciences,* which he and his colleague, Dr. John Esten Cooke, founded in 1828 and edited jointly for the next four years. Dr. Short's first major work was a *Prodromus*[63] and a *Florulae Lexingtoniensis*[64] published in 1828-29, which was a descriptive catalogue of the spring flora of the Lexington area. Among his other contributions were *A Catalogue of the Native Phaenogamous Plants, and Ferns of Kentucky* published in 1833 and co-authored with his medical colleague, Dr. Robert Peter, and field companion, Henry A Griswold.[65] Additions to the *Catalogue,* descriptive notes, and descriptions of new species were published four times from 1834 to 1840.[66] [67] [68] [69] Other now-classic papers were his *Instructions for the Gathering and Preservation of Plants for Herbaria,*[70] the first of its kind written in the Western Country, which preceded a similar one by Dr. John Leonard Riddell a year later;[71] a *Bibliographica Botanica,*[72] the first bibliographic listing with comments or annotations on the major botanical works and floras of the United States; and *A Sketch of the Progress of Botany in Western America,*[73] the most thorough account by a resident botanist of the history of botanical exploration west of the Allegheny Mountains. In 1829, Dr. Short wrote a paper on the *Cultivation of Certain Medicinal Plants*[74] and several short notes on descriptive medical case histories.[75] [76] [77] [78] [79] [80] In 1833, in a published *Introductory Address to a Course of Lectures on Materia Medica,*[81] he pointed out the importance of the study of botany to the physician and showed its close relationship to the study of medicine, much as Dr. Drake had done in many of his lectures and publications throughout his life.

As he was a professor in the medical schools, Dr. Short's reputation must have been high among his colleagues, for he served as Dean of the medical department at Transylvania University from 1828 to 1837, and as Dean of the Louisville Medical Institute from 1838 to 1849. In this role, he certainly was in a position to keep materia medica and scientific botany at the forefront of the medical curriculum. When Short left Transylvania University, botany was dropped from the curriculum of the medical department. This decision was only one of many that led to the downfall of the medical department of Transylvania University.

Dr. Short had few students who followed him in the study of botany. Dr. Robert Peter worked closely with him in botany at Transylvania University, but after Dr. Short left Transylvania, Dr. Peter devoted himself primarily to chemistry, since that was the discipline in which he was trained.[82] Dr. Clarendon Peck, a promising student of botany who graduated from Transylvania University in 1835, established a medical practice in Louisiana and wrote a flora of Sicily Island, Louisiana, but died two years later in 1837.[83] Dr. Josiah Gregg studied under Dr. Short at the Louisville Medical Institute.[84] He was a plant collector in the southwestern United States and Mexico, and became best known for his two-volume work on the *Commerce of the Prairies* published in 1844.[85] [86] As judged by most contemporary and later botanists, Dr. Short's greatest contribution was the extent, particular excellence, and beauty of his personal plant collection, and the generous profusion with which he distributed dried plant specimens to

fellow botanists throughout the world. Asa Gray, the foremost American botanist, wrote that the vast improvement in the character of dried botanical specimens among American botanists may be traced mainly to the example and influence of Dr. Short.[87] His personal herbarium, a gift from Short's family in 1864, is at the Academy of Natural Sciences, Philadelphia.[88]

MATERIA MEDICA AND BOTANY IN THE REFORMED MEDICAL COLLEGE

Thoroughly dissatisfied with the current medical methods as practiced so vigorously and viciously in the 1820s by the regular physicians, Dr. Wooster Beach (1794-1868) of New York City labored diligently and earnestly to bring about reform and establish a new school or system of medicine.[89 90 91] Dr. Beach was born in Trumbull, Connecticut, and graduated from the medical department of the University of New York. He entered medical practice and became a member of the New York County Medical Society. While at New York, he attempted to form a Reformed Medical College. Despite failure, he continued to instruct students in his methods of medical practice at his home. Dr. Beach and some of his friends who were sympathetic to his reform practices — Dr. Thomas Vaughn Morrow of Hopkinsville, Kentucky, Dr. Ichabod Gibson Jones of New York City, and Dr. John J. Steele of Fayette County, Pennsylvania, and others, but all graduates of regular medical schools — formed in 1829 a society under the name The Reformed Medical Society of the United States. At a meeting of the Society in 1830, it was agreed to establish a school somewhere in the Western Country, particularly along the Ohio River. Dr. Beach issued a circular advertising for a location to establish his Reformed Medical College. Fortunately one of these circulars came to the Worthington College, Worthington, Ohio, and evidently with a view to municipal expansion, liberal offers were made to rising institutions to locate in Worthington. Accordingly, at the insistance of Colonel James Kilbourne, the trustees of Worthington College sent an invitation to Dr. Beach, offering him the use of their charter and building for his proposed medical school in the West.

The Worthington College had been established first in 1808 under the name Worthington Academy, by an act of incorporation from the Legislature four years after the town of Worthington was laid out. In 1819, when a new charter was granted, the school was incorporated as the Worthington College. The school was under the leadership of Rev. Philander Chase and Colonel James Kilbourne. On the acceptance of Dr. Beach and his associates, an amendment was made to the charter, creating the medical department of Worthington College, more often referred to as the Reformed Medical College of Ohio. Dr. John J. Steele, a reformed allopathic physician of rare accomplishments, became the president of the Reformed Medical College. The school opened in December 1830. Dr. Steele was succeeded the following spring by Dr. Thomas Vaughan Morrow (1804-50) as president. Dr. Morrow, born in Fairview, Kentucky, was a young man, twenty-five years of age, of great medical knowledge and energy, a great lecturer, and private practitioner with an immense practice. Despite early untiring efforts by its enemies to destroy the Reformed Medical College, Dr. Morrow headed and built the department throughout its nine years of existence in Worthington.

For the first few years the medical department was in a thriving condition, and much enthusiasm was shown by faculty and students. Enrollments increased steadily, so that by 1838, eighty-eight had graduated.

Beginning with only three faculty, new faculty were continually added. By 1838 at least ten different faculty members had served the department.[92] A monthly journal, *The Western Medical Reformer,* was launched in 1836 and flourished for two years, advocating and disseminating the doctrines and practice of the reformers, and an infirmary was opened in 1837. For nearly ten years the faculty supported the institution without the least outside aid. Liberal state appropriations were made to the Medical College of Ohio, the then leading allopathic college in Ohio, but no such liberality was shown the Worthington College. The building was none too well adapted for a medical institution, and money was needed for more chemical apparatus, the anatomical museum, and the library. As the 1830s drew on, it became evident that the town was too small and out-of-the-way to become a great medical center, and this drawback, coupled with the animosities of its enemies and the difficulty of procuring anatomical material, led to the decision to abandon the Worthington College and move to Cincinnati. The College was accused of obtaining bodies through grave robberies. A climax came in the fall of 1839, when an infuriated mob stormed the building causing a riot. While the faculty and students defended the College with rifles in hand, someone betrayed the faculty by placing in the hands of the mob the key to the building. Dr. Morrow, seeing that further resistance was useless, announced his determination to yield, provided the faculty be allowed to take with it the movable college property. This request was granted. On 20 March 1840, the Legislature repealed the charter that allowed medical degrees to be awarded by Worthington College. Dr. Morrow moved the school to Cincinnati, where it ultimately became the Eclectic Medical Institute of Cincinnati, charted in 1844, and flourished throughout the remainder of the nineteenth century.[93] [94] [95]

Under the leadership of Dr. Morrow, the Reformed Medical College offered a viable instructional program in both materia medica and scientific botany.[96] [97] For the materia medica course John Eberle's *Therapeutics*[98] [99] or Wood and Bache's *Dispensatory of the United States*[100] was used, and for botany, Amos Eaton's *Manual*[101] was used for the identification of plants, and John Lindley's *Botany*[102] for their classification. In the course of the life of the school, several faculty taught these courses. Materia medica was taught in 1832 and 1833 and perhaps some other years by Dr. Ichabod Gibson Jones, in 1836 by Dr. Morrow, in 1837 and 1838 by Dr. Joseph B. Day, and in 1839 by Dr. Johnathan Roberts Paddock. Lectures in scientific botany were given by Dr. John Leonard Riddell in 1832 and 1833, followed by Dr. Paddock until the closing of the school.

Dr. Ichabod Gibson Jones (1807-57) was an exceedingly energetic man, took great interest in medical students, was regarded as an exceptionally fine and thorough teacher, and as a practicing physician was considered the foremost Eclectic. With his teaching of materia medica he took an interest in scientific botany by "writing several papers descriptive of indigenous plants and trees, of which the most notable, perhaps, is a description of the grasses of this region; and he prepared an herbarium of the flora of central Ohio, the only complete work of the kind of his time."[103] [104] [105] Unfortunately, no record of his writings or herbarium is known, if indeed they really existed.

Dr. John Leonard Riddell (1807-67), who lectured on botany, is one of the very interesting, colorful, and important figures among the pioneer plant collectors and writers of the Ohio valley during the first half of the nineteenth century.[106] [107] [108] Born in Leyden, Massachusetts, he received a good

primary education in several schools in New York, and took the A.B. degree about 1830 from the Rensselaer School at Troy under the direction of the celebrated botanical educator of the time, Amos Eaton. From that time until coming to Marietta, Ohio, in 1832, Riddell traveled widely in New York and southern Canada as an itinerant lecturer in chemistry, botany, and geology. Upon arrival in Marietta, he met Dr. Samuel P. Hildreth, who encouraged him to study the flora in the vicinity of Marietta. During the summer of 1832, as a means of making a living, Riddell collected plants and prepared them into sets to be sold to subscribers. Riddell had printed a list of plants with notes on habitat, abundance, morphology, and medicinal properties in the local newspaper, *Western Republican and Marietta Advertiser.*[109]

Fig. 3. Dr. John Leonard Riddell. From Kelley, Howard A. 1929. *Some American medical Botantists Commemorated in our Botanical Nomenclature.* New York: D. Appelton and Company, opposite p. 154.

While in Marietta, Riddell desired a more

stable situation with financial security, and sought a position to teach in a medical school, although he did not have, but wished for, a medical degree. He was appointed Lecturer in Chemistry and Botany in the Reformed Medical College, where he began his duties in the fall of 1832. He was pleased with the lectures of Dr. Morrow on obstetrics and of Dr. Jones on materia medica, which he attended and took notes. From Dr. Jones he undoubtedly learned much on materia medica, information which he incorporated into his later publications. While in Worthington he continued his field studies on the Ohio flora, this time in central Ohio. In 1835, this floristic work resulted in a *Catalogue of Plants, Growing Spontaneously in Franklin County, Central Ohio; Excluding Grasses, Mosses, Lichens, Fungi, etc.,*[110] which is considered the first county flora published for Ohio. While at the Reformed Medical College, Riddell matriculated and received a medical degree in 1834. Although he was successful as a teacher, Riddell was unhappy with the reputation of the institution, and he continued to seek a position in one of the regular or more prestigious and recognized medical schools, and so in the spring of 1834 he moved to Cinncinnati. While there he gave public lectures on botany and received an appointment in June 1835 as Adjunct Professor of Chemistry and Lecturer on Botany in the newly created medical department of the old Cincinnati College under the leadership of Dr. Daniel Drake. With Drake's activation of medical instruction in the Cincinnati College in 1835, he assembled one of the foremost and best-known medical faculties in this country, but the venture collapsed after four years of glorious existence primarily because the institution had no facilities for bedside or practical experience and because of the poor financial situation of the college.[111] [112] In addition to presenting his own lectures, Riddell attended classes and received his medical degree in 1836, a member of the first graduating class. Riddell continued his studies on the flora, this time in the Cincinnati area and southwestern Ohio. In 1833, while at Worthington, he began his most comprehensive botanical treatise, *A Synopsis of the Flora of the Western States,* the first regional flora west of the Allegheny Mountains, published in 1835.[113]

Although the *Synopsis* is a small book of 116 pages, it is packed with data. Both the scientific and common names of the plants are given. In very concise terms and with the use of abbreviations, Riddell was able to include information on time of flowering, color of the flower, height of the plant, duration of life span, particular situations (habitats), localities, and the reference work or collector (or observer) of the various taxa if Riddell had no personal observations on the plant. He described sixteen species of flowering plants from Ohio as new to science. Because of Riddell's association with the medical colleges and physicians, as well as his own interest in this area of information, numerous references are made to medicinal uses of plants. Introduced and/or naturalized species are also noted. Because Riddell included so much diverse information, we can today make considerable use of his book in order to interpret the original flora and the changes in the flora that have occurred in the past 140 years.

In 1836, Riddell added the twenty-eight-page *A Supplementary Catalogue of Ohio Plants.*[114] Previously, however, Riddell had published his very precise and detailed directions for collecting and preserving botanical specimens in the making of an herbarium.[115] By 1839 his *Monograph of the Ligneous Plants Indigenous to Ohio* appeared.[116] In the summer of 1836, Riddell traveled in northwestern Ohio, studying

botany and geology for the Geological Survey of Ohio,[117] and then left Cincinnati in the fall of 1836, and was appointed Professor of Chemistry in the Medical College of Louisiana at New Orleans, where he settled permanently. Because Riddell sold dried plant specimens, his herbarium is widely scattered. A residue of his personal Ohio herbarium is in the United States National Museum.[118] [119] A small herbarium of his Ohio plants, collected while at Marietta, is in the Lloyd Library, Cincinnati.[120] A similar collection has recently been located in the Marietta Public Library and is now deposited in the Marietta College Herbarium.[121]

One of the most scholarly, though less aggressive of the group of teachers at the Reformed Medical College was Dr. Johnathan Roberts Paddock (1803-78). Born near Cromwell, Connecticut, he was educated under the eminent Dr. Eliphalet Nott at Union College in Schenectady, New York. Before the establishment of the medical department, Dr. Paddock came to the Worthington College and taught the classical studies of Greek and Latin in the literary department. Shortly before Dr. Riddell left, Dr. Paddock began teaching in the medical department. He taught courses in chemistry, botany, materia medica, and pharmacy. Upon the closing of the school, Dr. Paddock moved to Maysville, Kentucky, where he continued in private practice for the next twenty years. Dr. Paddock has been described as a very skillful physician, classical scholar of extraordinary attainments, competent chemist, and splendid botanist. It has been said that he was able "to name all the plants and trees of the State by sight."[122] Between 1837 and 1840, Dr. Paddock assembled a collection of central Ohio plants which was purchased in 1919 by the University of Illinois, Urbana.[123] In the collection are specimens from ten other pioneer Ohio valley botanists, including the school teacher-botanist, John Samples,[124] of Urbana, Ohio, the businessman-botanist, William S. Sullivant,[125] of Columbus, and the physician-botanists, Drs. John M. Bigelow and Asa Horr of Fairfield County, Ohio.

At the Reformed Medical College, botany was a popular subject. In a description of the medical program in 1836, Morrow wrote: "The lectures on most of the departments [subjects] are not so full, with the exception of botany, on which branch a very full course is given. The great variety of vegetable productions with which the surrounding country abounds, in addition to the advantages which are derived by having access to the botanical garden connected with the College, afford good opportunities for the study of scientific and medical botany."[126] Dr. Paddock spoke of the necessity for a strong background in scientific botany and materia medica in a paper on *Qualifications of Physicians.*[127]

PHYSICIAN-BOTANISTS NOT ASSOCIATED WITH MEDICAL SCHOOLS

Among the physicians of private practice not associated with a medical school, only Dr. John Milton Bigelow of Lancaster, Ohio, and Dr. Asa Horr of Baltimore, Ohio, are probably the most noteworthy of mention because of their published studies on the botany of their local area, Fairfield County, Ohio. Dr. John Milton Bigelow (1804-78) was born in Peru, Vermont, but was brought as a child to Granville, Ohio, where he had his boyhood schooling. He obtained his medical degree at the Medical College of Ohio in 1832.[128] Dr. Asa Horr (1817-96) was born in Worthington, Ohio, and received his medical degree from the Cleveland Medical College. Both men developed their interest in botany in the late 1830s under the influence of the Columbus businessman-botanist, William

Starling Sullivant, rather than gaining an inspiration for botanical studies in the medical school.[129] [130] Neither of these schools taught scientific botany.

In 1841, Bigelow published a local flora of Fairfield County with notes on medicinal plants.[131] He listed more than 400 plants, of which more than 190 possessed medicinal properties. In the article he urged upon his professional colleagues the importance of studying botany, particularly in their respective local areas. In the same year, he and Dr. Horr published a catalogue of the plants of Fairfield County.[132] In 1834, Dr. Bigelow wrote a descriptive account of some of the interesting botanical highlights of Fairfield County, accompanied with a short history of botanical exploration in the Ohio valley.[133] Dr. Bigelow concluded his botanical work in Ohio in 1849 with a study of the medicinal plants of the entire state.[134] Bigelow's list of local plants were the last of this type by a physician in the Ohio valley. After 1850, Dr. Bigelow became engaged in botanical exploration in the western United States, and finally settled in Detroit, where he died. The location of his herbarium of Ohio plants, if it exists, is not known.[135] Dr. Horr moved to Galena, Illinois, in 1846, and a year later to Dubuque, Iowa, where he was a practicing physician and became well-known as an astronomer until his death.[136] His herbarium survives at Iowa State University.

A FINAL OVERVIEW

As taught in the medical schools, scientific botany survived for short periods of time in the Reformed Medical College (1832-39), Transylvania University (1817-18), the medical department of the Cincinnati College (1835-39), and the Louisville Medical Institute (1838-49). In Cincinnati, the Medical College of Ohio, founded in 1819 by Dr. Daniel Drake, survived continuously, although sometimes with difficulty, for fully seventy years and in 1896 became the Medical Department of the University of Cincinnati. Previous to 1850, no fewer than 12 individuals taught materia medica, but none of these individuals were distinguished in scientific botany, with the exception of Dr. John Eberle, who taught materia medica only one year. Scientific botany was never taught.[137] Scientific botany essentially survived and was perpetuated in the allopathic medical schools primarily from the strong and long-lasting influence and leadership of both Drs. Drake and Short. The teaching and writing of scientific botany in the nineteenth century in the Ohio valley reached its height in the decade of the 1830s mainly through the efforts of Drs. Short and Riddell. During that 10-year span, scientific botany was taught in three medical schools, and most of the significant floristic and medical botany papers were published. Ironically, the schools of the botanico-medical movement did not perpetuate scientific botany.

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In Anticipation of Flexner

By CRAIG F. DONATUCCI*

The science of medicine, under the impetus of the scientific-industrial revolution, underwent great change during the latter half of the 19th century. As breakthroughs on the frontiers of science and technology ushered in novel patho-etiological hypotheses, age-old concepts of disease fell into disrepute. Unfortunately, the system of medical education did not respond with alacrity to the bold new directions in medicine charted by men like Lister and Pasteur. Rather, not until 1910, with the publication of Araham Flexner's precedent setting report on medical education, did the majority of medical institutions respond to the challenges posed by advances in medical science. [1] However, some leading institutions did respond before the advent of Flexner's report, and in fact created the pattern of reform later popularized by Flexner. The University of Pennsylvania School of Medicine was one such institution.

The changes at the Pennsylvania school occurred gradually over the latter three decades of the 19th century, heavily influenced by the varied personalities of those serving as the force behind the reforms. The founding of the first university-controlled teaching hospital in the country, the Hospital of the University of Pennsylvania, was an early step toward the reform of medical education at Pennsylvania. When the university trustees decided to sell the 9th and Chestnut Street campus to the federal govenment and move to West Philadelphia, the medical school was forced to move with it. Thus the medical school, now located at 36th and Spruce Streets, was compelled to separate from several hospitals which had served as clinical teaching facilities since the era of the revolution. Though the Philadelphia Almshouse (later known as Philadelphia General Hospital) was nearby, relations between hospital staff and the medical faculty had long been less than cordial, and as a result, clinical teaching suffered. The Almshouse, therefore, was not sufficient and new facilities had to be found.

The first notion of a totally university owned and controlled teaching hospital appears to have originated with Dr. William Pepper, Jr. Pepper spoke with fellow alumni of the Medical Department, and together they formed a committee to raise funds for the new hospital. When Pepper and William F. Norris presented the university's provost, Charles Stille', with a proposal and method for the procurement of sufficient funds, the plans received only minimal approval. Stille' was trying to consolidate control of the university's autonomous schools under a central academic head, the provost. Independent fund raising was felt to be dangerous to this attempt; further, it represented a threat to Stille's own attempts to raise funds for the entire university. The Board of Trustees, however, passed the proposal over Stille's objections in 1872. The trustees decided to build a hospital on the south side of Spruce Street between 34th and 36th Streets. After sufficient funds had been secured, construction was begun, and the hospital was finished and dedicated in June of 1874. [2]

From the hospital's inception, the question

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of the medical faculty's role in hospital government was at issue. The trustees wanted the hospital to be an organic part of the university. The minutes of the May 1872 meeting of the Medical Faculty reported that a committee was created to study the question of hospital governance: "Drs. Carson and Rodgers were requested to act as committee to confer with Dr. Wood in regard to the propriety of resting the government of the hospital in the Medical Faculty." [3]

Six months before the hospital's dedication, the Board of Trustees received the medical committee's report. The committee recommended that control of the hospital be rested in a Board of Managers composed of: 1) five trustees to be selected by the Board of Trustees, 2) seven members of the medical faculty selected by that body, 3) three medical alumni selected by the Executive Committee of the Society of the Medical Alumni, and 4) three contributors to the hospital fund, to be elected annually. [4]

The report also suggested that the hospital staff consist of three professors on the medical school faculty—the Professor of Theory and Practice of Medicine, the Professor of Surgery , and the Professor of Obstetrics and Diseases of Women and Children. But these three professors were members of the staff ex-officio. The report also recommended the appointment of four "Clinical Professors of the Hospital of the University of Pennsylvania," and as many clinical lecturers as the medical faculty thought necessary. The report distinguished between hospital staff and faculty of the school of medicine.

The medical professors were apprehensive, reluctant to increase their number for fear that some personal economic loss might result if their individual prestige were to be diminished in a larger faculty. In the face of the faculty's strong emotion on this issue, the board was forced to compromise. Thus they adopted the committee's suggestion for the hospital, in effect officially sanctioning the distinction between the hospital staff and the medical faculty.

In February 1874, William Pepper was appointed Professor of Clinical Medicine, William Goodell was appointed Professor of the Diseases of Women and Children, and William F. Norris was appointed Clinical Professor of the Eye. These young physicians were to form the nucleus of a group which served to initiate several important changes in the future of the medical school.

The question of the medical faculty's role in hospital government was of some consequence to the future of medical education at Pennsylvania. The Medical Department, though it had borne the name of the university from its inception, functioned almost outside of the university. The standards and requirements for the degree of Doctor of Medicine were determined solely by the medical faculty. Due to this "distance" from the university community, the medical school did not feel the influence of the higher standards fostered in the university setting. If the trustees, who exercised control over the hospital, had succeeded in uniting the medical faculty with the hospital staff, the medical school would have become a more "organic" part of the university, and consequently could have drawn upon the intellectual resources of the university to better itself.

The increased clinical teaching facilities which the hospital supplied were not immediately integrated into the medical curriculum. Rather, as the medical announcement for 1876-77 states, "attendance on the clinical lectures delivered in (the hospital) amphitheater and its wards are part of the daily duties of the student." [5] Yet the requirements for the medical degree, as stated in the same announcement, make no mention of any mandatory clinical lectures for graduation.

At the University of Pennsylvania, the

medical alumni were the first and most vocal group to mention the need for a re-examination of the curriculum. For three consecutive years, the keynote speakers before the Society of the Alumni of the Medical Department of the University of Pennsylvania called for reform, depicting the weakness of the system then present and charting innovative paths toward change.

The first of the three, Dr. Alfred Stille', was an alumnus of the Medical Department and also held the post of Professor of Theory and Practice of Medicine in Clinical Medicine at the university. Stille' began by defining the underlying problems responsible for the reluctance within the Medical Department and the medical profession to change the system of medical education.

> By the fact that the success of a school is dependent not only on its merits but also on the number of students. This it is which destroys the independence of the schools, and compels them to perpetuate a system of education their judgement condemns, and their conscience reprobates. Were they not forced by the inexorable laws of trade to keep down the values of their wares, and furnish at the same prices as their rivals charge, some among them would soon be found to supply a system of medical education in accordance with their own attainments, with the ambitions of their educated pupils, and the wants of the profession, and in harmony with the higher standards used in the European schools. [6]

Stille' next offered a way to correct his economically-based deficiency:

> to place them (the faculty) upon a firm footing and enable them to remodel medical education. . . whenever the support of the professors shall cease to depend upon the number of the students, and shall be drawn from the funds in the hands of the college corporation, this end will be attained. They (salaried professors) are able to pursue their studies without being harassed by questions of finance, or hampered by debating whether they may dare do this, or dare not do that—some act of doubtful probity which a rival school employs to swell the number of its students.[7]

The answer for the university rested in the establishment of an endowment fund, which, "when added to the fees paid by the students themselves, would be sufficient to remunerate at least eight professors for courses of lectures of not less than six months each." [8]

The following year, 1874, Dr. Claddius H. Mastin addressed the alumni; he, too, referred to an economic problem in great need of reform. "In principle, the great body of our medical institutions are thoroughly agreed; and I believe that nine-tenths of them would hail with glory the advent of a possibility of brotherly cooperation for the real advancement of science. But the difficulty is this: Our Colleges Are Not Endowed." [9] Dr. Mastin realized that the establishment of sufficient endowment funds and the initiation of faculty salaries were just the beginnings of needed reform. "But the endowment of professorships is not within the sole power of our Faculty of Medicine, or we might fail assured that it would very soon be brought about. One thing is entirely in their power—the extension of the time of study requisite for graduation." [10]

Furthermore, Dr. Mastin recognized that the two years required of the students under the present medical curriculum were not being properly utilized, due to the inadequacy of the students pre-medical preparation.

> But even the customary two years at the college might go further than they do, if students went to college properly prepared. A certain amount of information is necessary before the student can intelligently follow a course of scientific lectures. . . he (the student, should) be subjected to a searching examination which should be a satisfactory test of his fitness to enter the medical class. It behooves the Alumni of this institution to turn their attention to this subject. This is the first step to a genuine policy of reform, and it is one in which they can give valuable aid. Fully prepare the student for his course of public lectures, and then require that he shall pass a satisfactory examination before he is admitted to the College. [11]

The third address was delivered by Dr. Cornelius G. Comegys in 1875. Dr. Comegys again referred to the educational difficulties which stemmed from the inadequacy of the entering students premedical preparation and called for an entrance examination. In addition, Dr. Comegys depicted the path

medical education must follow in the face of scientific advances.

> The age of teaching so largely by lecture has closed; the demands of science now are demonstrations. The student must be taught to acquire his anatomy, physiology, physics, chemistry, pathology, materia medica and practical medicine with his own hand and eye. . . . Under the new movement each student should be required to perform throughly and in stated periods this laboratory work; so for physics and chemistry, morbid anatomy and the rest. But for clinical medicine, more than all, for the classes should be arranged in small groups in order to secure the closest personal scrutiny of the phenomena of diseased persons, and of the effects of mode of treatment. [12]

Thus the three alumni of the Medical Department delineated the major areas in which reforms were necessary, not only at the University of Pennsylvania, but for most medical schools in operation at that time. Only after the personal financial incentives offered by large enrollments were removed could professors concentrate on the quality of their lectures. For the university to initiate a salaried faculty, sufficient endowment funds had to be secured. The present duration of the curriculum was too brief to adequatley expose students to all necessary areas of medical knowledge. Far worse, students were not utilizing this already taxed time to their best advantage, due to deficiencies in their pre-medical preparation. Entrace requirements needed strenthening. The didactic lecture as the sole method of instruction was antiquated, and of necessity must be replaced by seminars and laboratory instruction, enabling the student to learn on his own.

Under the impetus of the three keynote speakers, the medical alumni researched a proposal outlining the necessary steps for improving the curriculum of the Medical Department and presented this proposal to the Board of Trustees. In addition, the trustees were asked by the hospital staff to arrange a triangular meeting, at which the trustees, the hospital staff, and the medical faculty could discuss curricular reform. However, the medical faculty did not fully accept the need for the reform of their curriculum, and rebuffed the hospital staff in their attempt to discuss the matter. Dr. Robert E. Rodgers, Dean of the Medical Faculty, wrote to Dr. George B. Wood, Chairman of the Hospital Committee on the Medical Department, in reply to the requested meeting.

> They (the faculty) have since learned officially from Mr. Biddle (Secretary of the Trustees) that your committee have recommended the initiation of a committee of the hospital staff to join in the conference.
>
> The faculty would respectfully refer you to the regulations of the Medical Department enacted by the Board of Trustees published in the catalog.
>
> 'The Medical Department is under the immediate government of the medical professors, who constitute the Faculty of Medicine, subject to the rules and statues of the Board of Trustees.'
>
> Therefore, the feeling is that having the presence of others to deliberate upon the affairs of the faculty would not be conducive to the confidential relation which has always existed. [13]

In spite of this rebuttal, the hospital staff still sought closer relations with the Medical Faculty. On March 1, 1875, at an informal meeting of the faculty held at the residence of Dr. Agnerw, William Pepper and William Goodell of the hospital staff expressed a desire to foster closer ties with the medical faculty, but there is no record of any response. Later in that year it became apparent that the trustees might appoint a committee to study areas in need of reform at Pennsylvania, in spite of the medical faculty's objections. A special meeting of the faculty, called by Dr. S. Weir Mitchell, was held on November 16, 1875. After this meeting, in a letter written in December 1875, Dean Rodgers relayed the faculty's position to the Board of Trustees.

> The faculty desire to reiterate what they in no manner admit, inferiority in the medical education given in this University, as compared with that of any other medical school in the country. . . . Nevertheless, while proud of her past history, present good work and high reputation, they (the faculty) are desirous to take a

> step even beyond the present high position, whenever such a step becomes practicable . . . Were it in their power, through the possession of the Board of Trustees of adequate money, to sustain them in so grave a movement, the faculty would desire to increase the time of attendance for graduation to three years, and introduce more frequent recitations upon the subjects of the lectures. [14]

The trustees, cognizant that the call for reform had spread farther than the university's medical school decided to appoint the special committee, to be headed by Fairman Rogers as chairman. The first meeting of the committee occurred in December 1875, with further meetings held weekly until the following March. In February 1876, the committee presented a preliminary summary of the changes it would recommend in its final report. These included the unification of the hopsital's staff with the medical faculty, the lengthening of the curriculum, and the introduction of a grading system into the curriculum.

The final report of the special committee was published in pamphlet form on March 28, 1876. The committee:

> recommended to the trustees a general reform and reorganization comprising most of the proposals they had been considering. The medical course should be increased to three annual terms (of five months each, as before) in place of the former two annual terms. The curriculum should be graded . . . admission to each successive course should be granted only after examination in the preceeding subjects. The students fees should be paid to the Treasurer of the University, the expenses of the school should be borne by the Board of Trustees, and the professors should receive fixed salaries. Until an endowment fund could be secured, the committee advised against 'any change which might diminish those who are incompetent to enter.' [15]

The medical faculty replied to the report of the special committee in a letter dated April 3, 1876. The faculty advised against haste in the decision to implement recommendations contained in the report. "[The faculty] respectfully request that the Board of Trustees will not act out immediately upon the report of the committee, but delay the final determination of the questions at issue, until the faculty shall have had time to prepare a full exposition of their views upon them."[16]

In the Fall of 1876, the trustees adopted the recommendations of the special commitee in spite of the faculty's request for a delay. After sufficient funds were procured, the reforms were enacted. The older, more conservative members of the faculty were quite upset over the implementation of the new reforms. The trustees received a letter of resignation from Dean Rodgers on May 7, 1877. Dr. Francis G. Smith also resigned his chair as Professor of the Institutes of Medicine, and several other older faculty members threatened to resign. In the wake of Dean Rodgers's resignation, Dr. James Tyson was appointed Secretary of the Medical Faculty, and later was made Dean.

The announcement of the Medical Department of the University of Pennsylvania for the academic year 1877-78 gave this description of the curricular reforms:

> Last year the Trustees and Faculty of Medicine of the University took the bold and decisive step of prolonging the course of medical study to three years, and of making the various improvements in the curriculum rendered practicable by such an extension . . . With but two courses, of five months each, of lectures, it is impossible to grade the study so that the student shall be advanced from one to the other as he increases in knowledge, the beginner and the man on the eye of graduation receiving the same instruction. Further, it is equally impossible to give sufficient practical teaching either in the laboratory or at the bedside. By prolonging the period of medical study, the authorities of the University have been enabled to so arrange the curriculum as to allow of the constant introduction of new matter as the student advances, and at the same time is secured at least as much repetition of more essential subjects, as in the former system of teaching. A prominent feature of the present curriculum is systematic laboratory work in the fundamental medical sciences, as well as the personal teaching of each student in practical subjects of the greatest importance—such as physical diagnosis, clinical medicine, clinical surgery, and clinical gynecology. Henceforth, a graduate of the Medical Department of the University will not only have been trained in the theory of medicine, but also taught to perform the clinical, pharmaceutical, and microscopic manipulations required by his calling . . . . [17]

Before the reforms could be fully implemented, laboratory space had to be provided for the students. The trustees recognized the inadequacy of the facilities then available in the laboratories of Anatomy, stating, "The present Medical Hall is well adapted for the old plan of teaching, which requires no laboratory instruction, but is totally inadequate for the new plan of teaching, which calls for elaborate personal instruction of each student." [18] Therefore, the trustees directed that a laboratory building be constructed on the corner of 36th and Spruce Streets, next to the Medical Hall, and thus the Hare building was dedicated by S. Weir Mitchell in October of 1878.

The changes in the curriculum of the Medical Department were generally well received by the profession; however, not all were happy with the tenor of the announcement. The faculty of Harvard Medical School, which had implemented similar reforms a few years earlier, had not been given due credit, and as a result they were quite upset. The prime force behind the reforms at Harvard had been the newly selected President of Harvard University, Charles W. Eliot. Eliot wrote of his displeasure in a letter dated June 21, 1877.

> The change in the Medical School of the University of Pennsylvania is encouraging, as far as it goes, but five months are not half as good as nine. They have only ventured upon three courses of five months each,while six years ago we insisted upon three years of nine months each . . . There is another matter in which I am disappointed in the action of the University of Pennsylvania. As you say, the action is a direct result of the success of the Harvard School in making much more fundamental changes. The professors of the Pennsylvania School do not hesitate to acknowledge this in private, but in the circular which you send me and in the announcements they make in the medical journal you will look in vain for any allusion to this unquestionalbe fact. I am perfectly used to this sort of procedure. Most american colleges copy without acknowledgement from Harvard, reviling her all the time. But from men like Peter Lesley, William Sellers, Weir Mitchell, and Joseph Leidy I confess I expected a juster treatment. [19]

The curricular reforms instituted in 1877 were of fundamental importance, introducing the "scientific method" into what had long been a stagnant educaton process. However, this new method of instruction created its own set of difficulties, necessitating further change at Pennsylvania as the century came to a close.

In 1880, Charles Stille′, still fighting to consolidate the university under one academic head, resigned his position as provost. The Board of Trustees, after offering the post to Phillips Brooks of Boston, who declined, asked William Pepper, Jr. to become provost. Pepper accepted, and shortly thereafter, largely brought the very consolidation for which Stille′ had struggled in vain. With the ascent of Dr. Pepper, Professor of Clinical Medicine, to the Provostship, the medical department was more firmly cemented as an "organic" part of the universtiy.

In 1884, Dr. Alfred Stille′, the first alumnus to clamor for reform at Pennsylvania, resigned his chair as Professor of Theory and Practice of Medicine. Pepper assumed that chair, in addition to his duties as Provost and private physician, and vacated the position of Professor of Clinical Medicine. To fill that post, the university turned to William Osler, a Canadian with a far-reaching reputation for excellence in clinical medicine. This was a bold step for the university, for, unlike all of the other members of the faculty at that time, Osler had neither attended the university as an undergraduate, nor undertaken graduate work there.

After Osler assumed the post of Clinical Professor of Medicine he revolutionized teaching wards in the University Hospital. Furthermore, Osler owned the only microscope in the hospital, and with it he organized the first clinical laboratory at the institution. Because he did not have a private practice, Osler was able to devote some of his

time to pathological investigation. "Osler brought a fresh scientific outlook into the practice of medicine." [20] Unfortunately for the university, after five years at Pennsylvania, Osler was called to head the Department of Internal Medicine at Johns Hopkins Hospital. Osler could not refuse the opportunity to join the staff of what was to become one of the world's great medical facilities, so he moved to Baltimore in 1889.

The decade 1880-90 witnessed a large increase in the number of faculty members teaching basic medical science, and the first two years of the curriculum became largely devoted to that area. This led to a further exacerbation of problems stemming from the inadequacy of student's pre-medical preparation. Some students, having gone through a rigorous university program, were very strong in the sciences; others, lacking this exposure were correspondingly weak.

The first year curriculum became somewhat remedial, and to compensate for this, the medical faculty, in a special meeting on October 29, 1891, passed a motion that "all graduates in Arts and Sciences who have spent the last two years in a course preparatory to medicine equivalent to the following be admitted to the second year of the medical course: General Biology and Zoology, 16 hours; Mammalian Anatomy, 12 hours; Botany, 12 hours; Chemistry, 6 hours; Physics, 6 hours."[21] This waiver of the first year of the medical curriculum only became possible after the medical faculty had instituted a compulsory four year course.

> The change from a three year course to a four year course was indirectly proposed by the Chairman of the Committee on the Department of Medicine of the Board of Trustees. The matter was proposed at a special meeting of the Faculty held April 14, 1891. Opposition to the measure was strong, and consequently its further consideration was deferred until a subsequent meeting, at which special meeting held May 2, 1891, the proposition to increase the course of study was on motion not adopted. Subsequently at an adjourned special meeting held May 9, 1891, it was resolved that the Faculty pledge itself to a four year course to take effect in the fall of 1893. This latter action was taken after the statement had been made to the Faculty that if the Faculty did not move in the matter the Board of Trustees would move. [22]

The faculty announced the new four-year course in a circular dated July 1, 1892, and the new course began on October 2, 1893. In that same circular, the faculty announced the resignation of Dr. Tyson as Dean of the Medical Faculty and recommended the appointment of Dr. John Marshall as the new Dean.

During the first half of the decade 1890-1900, overcrowding in the laboratories of the Hare Building became critical. The faculty appointed a special committee to investigate the problem, and the "Committee of Lab Building and Equipment" delivered its report on May 2, 1896. The report, written by Dean Marshall, found the present facilities wholly inadequate and recommended that: 1) sufficient funds be secured to erect and equip additional laboratories of physiology, pathology, and pharmacology; 2) an architect be appointed to plan the building; and 3) the building be ready for occupancy by the 1897-98 session. On May 20, 1896, Dean Marshall sent a personal note to the trustees urging action on the matter. The trustees decided to go ahead on the laboratories, and after sufficient funds were obtained, construction was begun. The building was located on Hamilton Walk, behind the Men's Quadrangle, and is now the central facility of the present medical school. A pamphlet delivered at the dedication on June 10, 1904, contained a short history of laboratory science at the university.

> The completion of the new medical department in West Philadelphia and its active operation date from 1877. The facilities for practical teaching were unexcelled at any institution and regared as ample for 25 or 50 years. As a matter of fact, the intervening quarter of the century, with its unparalled advances in science and the consequent increased demands for practical teaching, proved the need for further enlargement and the new laboratories are the University's response to this need. [23]

The new facilities alleviated some of the overcrowding in the Medical Hall and in the Hare Building.

New facilities were not enough, however, for the university was having difficulty staffing them. Basic research had suffered at Pennsylvania over the last decade of the 19th century, and part of the cause was stated by John Shaw Billings, director of what was then the Laboratory of Hygiene. In an undated memorandum, Billings spoke of the problems facing research at the university.

> There are few persons competent and willing to undertake the work; if we can find two or three a year, it is as much as we can expect, and those that we do get we cannot keep— they leave for better places just as they are beginning to be really valuable workers. Thus, Dr. Wright has gone to Harvard, Dr. Ravenel is going to Princeton, and Dr. Rabinowitz will probably go to Bryn Mawr because they can get better pay than we can afford. We have done good work in fitting these people and putting them in the way of getting such positions, and we ought to do more if possible. For this purpose the most needful thing is two or three more fellowships, paying $500 a year. It is through such fellowships; and in no other way, that laboratories of research can get hold of the right kind of material for developing into investigators and teachers. As our teacher's work increases, the teachers and demonstrators have less time for research... I do not suppose just now to secure any endowments for original research, but is it not possible to obtain two or three thousand dollars for this purpose for a years work? [24]

It appears that as basic research became more important to academic medicine, the university, because it had not had the foresight to find funds for research, was losing promising faculty members to better paying institutions.

In 1894, due to failing health, Provost Pepper was forced to resign. After twelve years as provost, and many more in association with the hospital staff, Pepper had accomplished much for medical educaton at Pennsylvania. During Pepper's tenure, the medical school had instituted a fully graded curriculum, added practical laboratory instruction for every student, constructed a hospital totally controlled by the university, provided for a salaried faculty, and prolonged the course of study to four years. However, the entrance requirements enforced at the time of Pepper's resignation were still inadequate, a fact that caused Pepper some embarrassment. Pepper was succeeded as provost by Charles Custis Harrison in 1894.

Entrance requirements at the turn of the century were not only an issue at the university but throughout the nation. Many proprietary medical schools were in existance, providing anyone with sufficient finances a "medical" degree. Some did not even require an elementary education. The situation did not drastically improve until the publicaton of Flexner's report.

The medical faculty, in anticipation of Flexner, moved earlier, mindful that the Johns Hopkins University, from its inception, had required its matriculants to possess their Bachelor's Degree. In an announcement published in 1907, the faculty declared the following changes in the admission requirements. First, beginning with the session of September, 1908, a foreign languge, Physics, Inorganic Chemistry, Qualitative Analysis, and General Biology were necessary in addition to the prior requirements. Second, for the term beginning September, 1910, work equivalent to the first college year of a program in science would be required in addition to the above. Finally, after the academic year 1910-11, each student would be required to present work equivalent to the first two years of a Bachelor's program in the sciences in order to gain admission to medical school. The faculty felt that "this combination of special and general training is without doubt a much more logical requirement than a college degree, which does not imply any special preparation for medical studies." [25]

Abraham Flexner and his committee visited the Medical School in March, 1909. After speaking with faculty members, students, and administrators, and examining

the laboratories and the clinical facilities, Flexner reported:

> (1) University of Pennsylvania Department of Medicine. Organized 1765. An organic part of the university.
>
> Entrance Requirement: One year of college work, in which, conditions have been so freely allowed that it is open to question how much the standard has this year been actually elevated.*
>
> Teaching Staff: 157, of whom 26 are professors . . . The laboratory instructors, with certain assistants, devote their entire time to teaching and research.
>
> Laboratory Facilities: Five separate well-equipped buildings are provided for the laboratories of the department . . . The department possesses an admirable library. Its scientific faculty has been recently strengthened by the creation of chairs of physiological chemistry and experimental medicine, specially endowed. The department has, therefore, admirable material equipment.
>
> Clinical Facilities: The University Hospital of 350 beds, of which 280 are available for instruction, is contiguous to the laboratories. There is a separate maternity pavilion of 50 beds. Considerable use is also made of several other hospitals . . . Abundant material is thus obtained. [26]

Flexner found the Medical Department at Pennsylvania in a form similar in most respects to that of today. The report was not as kind to other medical institutions of that time; many were forced to undergo radical change, and some were eventually to close. In the aftermath of the report, the face of medical education throughout the country was changed forever, and Abraham Flexner is commonly considered the source of that reform. However, at the Pennsylvania School the changes necessary to integrate the expanding frontiers of science and technology into the process of medical education arose some 40 years before, in the minds of a few far-sighted men.

*Flexner visited the University during the period of gradual tightening of the entrance requirements; his report of one year of college work as necessary for admission was inaccurate in 1910, for by that year two academic years of college study were required.

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ERRATUM

The following note should be appended to the paper "The Rhythm of Life Among the Hudson Valley Dutch in the Eighteenth Century" *by Alice P. Kenny, which appeared in the April issue of this journal (vol. 45, no. 4: 217-223).*

I would like to express my appreciation to Cedar Crest College for three faculty research grants to support transcription of these registers, to the National Science Foundation for a grant to Cedar Crest College to instruct faculty in the use of computers, to Mr. Gerald Cozzolino for preparing the programs, and to Lynn Bryan for tabulating the results.

Memoir of Kendall A. Elsom (1904-1978)

By FRANCIS C. WOOD, M.D.

Dr. Kendall A. Elsom was elected a Fellow of this College in 1937 and continued his active association with it for forty-one years, until his death on April 3, 1978, at the age of 73. He made many significant contributions to its activities, having been Treasurer from 1961 to 1969, a member of the Finance Committee, and a member of several other committees concerning gifts, planning for the future, and development. He became a censor in 1977.

He was born on April 27, 1904 in Madison Wisconsin. His father, James Claude Elsom, a physician and a graduate of the Medical College of Virginia, established the Department of Physical Rehabilitation at Wisconsin Medical School. I am told that it was one of the first of its kind in America.

In his late teens, Kendall Elsom entered the University of Wisconsin. He was a star varsity basketball player, a member of an orchestra, in which he played the clarinet, and a member of a variety of singing groups, having a fine tenor voice and a good ear for harmony. He entered Wisconsin Medical School in 1924, and from there he transferred to the Medical School of the University of Pennsylvania. He received his M.D. in 1927. After internship at the Graduate Hospital, he joined the Department of Pharmacology under Dr. Alfred Newton Richards, where he engaged in teaching and investigation. He also became a part of the Department of Medicine, where he joined the section on Gastroenterology.

During World War II, he enlisted as a Major in the Medical Corps on the staff of the 20th General Army Hospital, the unit which was formed at the University of Pennsylvania. It was activated on May 15, 1942 at Camp Claiborne, Louisiana. It crossed the Pacific to Bombay, India. There it entrained for Margherita, Assam, and established itself at the beginning of the monsoon in a palm leaf, bamboo, and mud floor hospital. Within two months, there were 2500 Chinese and American troops in its 1000-bed hospital. Dr. Elsom was Chief of the Gastrointestinal Section and had two Chinese medical wards under his care, each with forty bamboo chungs (beds) in it. He wrote important papers on amoebic and bacillary dysentery. He made a study of our attempts to cure duodenal ulcer in the China-Burma-India theater and wrote an illuminating account of our failure. Later, he became a Lieutenant Colonel and Assistant Chief of the Medical Service. When he returned to the United States in the autumn of 1947, he was appointed Chief of the Medical Service at the Fort Benning Hospital.

After discharge from the Army, Dr. Elsom returned to the faculty of the Medical School of the University of Pennsylvania. He became Chief of the Medical Out-patient Department, Chief of the Diagnostic Clinic, Second in Command in the Department of Medicine, and a Clinical Professor of Medicine.

In 1961 he became Medical Director of the Scott Paper Company, set up their Medical Department, and remained there for the rest of his life.

In his early days, Dr. Elsom studied and wrote on kidney disease, hyperparathyroidism, and gastrointestinal disease. After the war he conducted a follow-up study of a number of individuals who had been

patients with scrub typhus fever in the 20th General Hospital. He showed that, despite the desperate illness this disease could produce, there were few if any sequellae which could be proved to exist several years after the patient had recovered. Later on Dr. Elsom made an extensive study of the periodic health examination, its methods, and the results it could be expected to achieve.

He was a member of Alpha Omega Alpha, a diplomate of the American Board of Internal Medicine, and a member of many professional and medical organizations. Among them were the American Society for Clinical Investigation and the American Gastroenterological Association.

Dr. Kendall Elsom was a superb physician, a careful observer, and a wise advisor. He was one of the most universally-liked men among people of all ages. His knowledge and mastery of the art of medicine made him an effective model for medical students and young physicians who worked with him. He was skilled in the science of medicine, but never lost sight of the human side of the patient's problem. At the conclusion of his study of a patient, he could mentally step back from the scientific, medical facts, get all aspects of the entire situation in proper perspective, and bring into action his kindness, tolerance, thoughtfulness, sympathy and understanding. He was a true *gentle man*!

Memoir of Robert C. Horn, Jr. (1913-1976)

By JONATHAN E. RHOADS, M.D.

Dr. Robert C. Horn, Jr. was a resident member of the College of Physicians of Philadelphia from 1950 to 1955. In 1955 he moved from Philadelphia to Detroit to succeed Dr. Frank W. Hartman as Head of the Laboratory Division of the Henry Ford Hospital and at that time became a non-resident Fellow. He was widely known throughout the country as an expert surgical pathologist as well as the administrator of a large and important laboratory of clinical pathology. He was a person of very warm personality and was especially beloved by the surgical staff at the Hospital of the University of Pennsylvania during the years when he was in charge of Surgical Pathology at that hospital.

Dr. Horn was born in Allentown on July 7, 1913. His father was Dean of Muhlenberg College, and Bob graduated from the College with a B.S. in 1933 and then attended the Medical School of Yale University for the next four years, receiving his M.D. in 1937. He returned to Pennsylvania for internship at the Geisinger Memorial Hospital in Danville and then went to Columbia University's College of Physicians and Surgeons and the Department of Surgical Pathology at Presbyterian Hospital in New York for his residency during the years 1938-42. Here, his preceptor was the late Arthur Purdy Stout, with whom he maintained a close association until Dr. Stout died. He came to the University of Pennsylvania in 1942 and remained for thirteen years, becoming Professor of Surgical Pathology and also coordinator of cancer teaching in the school of medicine and surgical pathologist and Director of the Tumor Clinic in the Hospital of the University of Pennsylvania. In 1955 he became Pathologist and Chairman of the Department of Pathology at Henry Ford Hospital in Detroit, Michigan, remaining in this post until his death. In this capacity, he had responsibility not only for surgical pathology, but for all phases of laboratory medicine for this very large and active hospital. At the time he accepted the positions, there were over 100 employees in the department whose activities he directed.

Dr. Horn was very active with the American Cancer Society and in other agencies which carried on the effort to reduce cancer morbidity and mortality. He was a member of the Board of Trustees of the Southeastern Michigan Division of the American Cancer Society from 1960-65 and became President-elect in 1964. He became a Trustee and member of the Executive Committee of the Michigan Cancer Foundation in 1965, and became Vice-Chairman in 1972-73 and Chairman in 1974.

At the national level, he was a member of the Clinical Fellowship Committee of the American Cancer Society for a three-year period, 1959-62, and a member of the Advisory Committee for Clinical Investigations 1970-72. He served as a member of the Pathology Study Section at the National Institutes of Health for the standard four-year term, 1966-70 and was a member of the Advisory Committee on Hospitals and Clinics of the United States Public Health Service somewhat earlier, and Chairman of the National Committee for Careers in Medical Technology. He also served as a Trustee of the Detroit Institute for Cancer Research 1956-64 and was President

of that organization in 1964. He was a Consultant to the Armed Forces Institute of Pathology beginning in 1954 and Consultant at Philadelphia Veterans Administration.

Among his many honors were memberships in Alpha Omega Alpha and Sigma Xi. He was an honorary member of the Minnesota Society of Clinical Pathologists. He recieved the Distinguised Alumnus Award from Geisinger Memorial Hospital in 1965, the Alumni Achievement Award from Muhlenberg College in 1965, and in 1976 was the recipient of the Pathologist of the Year Award. Dr. Horn was active in a number of professional societies, including the American Medical Association, serving as Chairman of the Section on Pathology and Physiology in 1962. He was a long-time Fellow of the College of American Pathologists, serving as Vice-Speaker of the Assembly, 1961-64, Speaker of the Assembly, 1964-68, member of the Board of Governors, 1968-71, Secretary-Treasurer, 1970-71, Vice President 1971-73, President-elect in 1972, and President, 1973-75. He was also a Fellow of the American Society of Clinical Pathologists and served as Chairman of their Council on Anatomic Pathology. He was a former President of the Michigan Society of Pathologists, a member of the Council of the International Academy of Pathology, a member of the Detroit Academy of Medicine, the Detroit Medical Club, the New York Academy of Sciences, the American Association of Pathologists and Bacteriologists, the American Thyroid Association, the Halsted Society, and the Arthur Purdy Stout Society, of which he was President from 1970 to 1972.

His more than a hundred publications reflect his board interest in pathology and particularly in malignancy. During the war, he participated in studies on experimental phosgene poisoning, with special reference to early and late phases of the pathologic changes. He brought to his many studies thoughtful insights and the most conscientious interpretations. He probably wrote more on the pathology of the thyroid than on any other organ, and in his later years he wrote a number of editorials for *The Pathologist,* including his Presidential Address when he became President of the College of American Pathologists in 1973.

During their Philadelphia years, Bob Horn and his wife Dorothy were frequent hosts to their contemporaries on the staff of the Hospital of the University of Pennsylvania. The warmth of their hospitality at their house in Lansdowne is recalled with great pleasure by many of us who were their guests. The Horns had been married 36 years and had three children, Robert C., III, Thomas L., and Ethel M.

Few members of the staff of the Hospital of the University of Pennsylvania contributed more to the stimulation of their colleagues and to fruitful collaboration. As a participant in teaching exercises, Dr. Horn was always well-prepared; he was widely read and contributed much. His death at 63 cut short a career which had already flowered to a remarkable degree but seem far too brief because of his great continuing productivity. He had a genius for good relationships and if he ever had any antagonists, I was never aware of them. His last 21 years were spent largely in Detroit. He maintained his membership in the College of Physicians of Philadelphia and continued to add to the good name of the College through his numerous accomplishments.

Memoir of Robert Bruce Brown (1908-1977)

By LUTHER L. TERRY, M.D.

Dr. Robert B. Brown, Surgeon General, Retired, of the U.S. Navy died at his home at Kitty Hawk, North Carolina on November 12, 1977. Dr. Brown was 69 years of age, having been born in Meadville, Pennsylvania on June 29, 1908.

Dr. Brown was a Fellow in the College for more than 30 years. He received his B.S. degree from Allegheny College in 1929 and his M.D. degree from the University of Pennsylvania in 1933. He served his internship at the University of Pennsylvania Hospital from 1933 to 1935. He then had two fellowships at the University of Pennsylvania, the first in Thyroid and Neurosurgery with Dr. Charles Frazier (1935-36) and the other in General Surgery with Dr. E. L. Eliason (1936-41). He served progessively at the Medical School as an Assistant Instructor in Surgery, Instructor in Surgery, and Associate in Surgery. He received his Doctor of Science (in Surgery) from the University of Pennsylvania Graduate School of Medicine in 1941.

He reported for active duty in the Navy in 1942 and had an illustrious career in the naval medcal service. His first assignment was to the Naval Hospital, Philadelphia; he then had duty afloat on board the USS SOLACE and in 1943 was appointed as Chief of Surgery at the Naval Hospital, Annapolis, Maryland. In 1945 he served as Chief of Surgery on board the hospital ship TRANQUILLITY, and from later that year until 1950 he was Assistant to the Chief of Surgery at the Naval Hospital, Philadelphia. He next joined the USS REPOSE, which operated in the Korean area of hostilities. For his service aboard the REPOSE, he was awarded the Bronze Star Medal.

In 1915 he reported as Chief of Surgery at the Naval Hospital, Bethesda, Maryland and while so assigned also served as Clinical (Adjunct) Professor of Surgery at Georgetown University School of Medicine. In March 1960 he assumed command of the Naval Hospital, Bethesda, and was promoted to the rank of Read Admiral. On August 1, 1963 he was appointed Assistant Chief of the Bureau of Medicine and Surgery and in January 1965 was appointed by the President to be Surgeon General of the Navy and Chief of the Bureau of Medicine and Surgery for a period of four years. He was promoted to the rank of Vice Admiral in October 1965 and later was awarded the Distinguished Service Medical for "exceptionally meritorious service" as Surgeon General. On February 1, 1969 he was transferred to the Retired List of the U.S. Navy.

In addition to the Distinguished Service Medal and the Bronze Star Medal, Dr. Brown also received the Asiatic-Pacific Campaign Medal with one star, the American Campaign Medal, World War II Victory Medal, National Defense Sercice Medal with bronze star, Korean Service Medal with five stars, United Nations Service Medal, Antarctica Service Medal, Expert Rifleman Medal, and the Expert Pistol Shot Medal. He also received the Korean Presidential Unit Citation.

Dr. Brown was a Diplomate of the American Board of Surgery and a Fellow of the American College of Surgeons. Among others, he was a member of the Philadelphia County, the Pennsylvania State, and the American Medical Associations, the Society of University Surgeons, the American

Surgical Association, the Halsted Society, and the Philadelphia Academy of Surgery. He received an honarary Doctor of Science degree from Allegheny College in 1962, the Founder's Medal of the Association of Military Surgeons of the United States, and an honorary Doctor of Medicine from the Catholic Medical Center, Seoul, Korea. He was a member of Sigma Xi, Phi Beta Kappa, and Alpha Omega Alpha.

Upon reviewing all of these accomplishments and honors of Dr. Brown, it is obvious that he was an exceptionally capable surgeon, but he was also a distinguised medical leader and a great humanitarian. I had the privilege of working with him when he was on the staff of the National Naval Medical Center and subsequently, when he was Surgeon General of the Navy. I developed great admiration and friendship for this man, and I considered him a truly exceptional surgeon and gentleman. The manner in which he discharged his professional and official responsibilities always reflected warmth, concern, and understanding. He was never too busy to listen to problems of his patients and his friends and furthermore, he responded to them.

The most heart-warming experiences I had with Dr. Brown happened with the illness of a member of my family. My son, Luther, Jr., became ill with abdominal pain. We took him to the Naval Hospital and though Dr. Brown was then Commander of the Medical Center, he assumed charge of the case because of our personal friendship. The event occurred about two weeks before my son was to return for his final year in prep school. He was an enthusiastic athlete and a key man on the football team. Dr. Brown recommended surgery, which we readily accepted. However, my son informed Dr. Brown that he was to report for football training very soon, and he emphasized how important it was to him. At surgery Dr. Brown discovered an acutely inflamed appendix, but it was an extremely long appendix and extended far up behind the caecum. Dr. Brown was able to ligate the base of the appendix and dissect up the proximal portion, but he was unable to complete the procedure through the muscle-splitting insicion he was using. Rather than extending the incision by cutting across the musculature, Dr. Brown made an additional muscle-splitting incision about 2-1/2 inches higher and completed the appendectomy without incident. Two weeks later my son was beginning football practice and today possesses two abdominal scars as a result of a single uncomplicated appendectomy. I would dare say that he is probably one of the few of us who can demonstrate such an unusual surgical procedure. To me, this incident illustrates not only the surgical skill of this man but also a degree of humanistic understanding and appreciation not always present in our medical profession.

There were many other occasions upon which I observed the skill and understanding of Dr. Brown. he was truly an exceptional individual.

Following retirement from the Navy, Dr. Brown suffered from severe generalized rheumatoid arthritis and had distressing reactions to some of the therapy which he received. Towards the end he developed a rapidly fulminating lymphosarcoma which was responsible for his death.

Those of us who knew and worked with Bob Brown felt that we were fortunate to have him as a friend and professional colleague. His career was one of such outstanding ability and devotion to service that all of us, his family, his colleagues, the Commonwealth of Pennsylvania, the University of Pennsylvania, the College of Physicians of Philadelphia, and the United States Navy, can take great pride in the accomplishments of this outstanding surgeon and leader in the

medical profession.

Bob lived the last few years of his life at his home in Kitty Hawk, North Carolina, but he retained a strong attachment to his hometown of Meadville, Pennsylvania. His wife, the former Jane Richardson of Pitman, New Jersey, still resides at their North Carolina home. They have one daughter, Joan, married to an attorney in Evansville, Indiana; they have four children.

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Ancient Greek Feeding-bottles

By CHRISTOS S. BARTSOCAS, M.D., D. MED. SC.*

The earliest Greek references to breast-feeding are found in Homer,[1,2] who tells us that an infant could either be nursed by its mother, or in her inability to do so, by a slave, called Titon. During the classical period this person could also be a Greek woman other than a slave. Thus Hector was nursed by his mother Hecuba[1] and Telemachus by his mother Penelope[2], while Odysseus was breast-fed by Eurykleia[3].

Both Galen[4] and Soranus of Ephesus[5] recommended breast-feeding as the only nutriment of infants until the sixth month of age. Moschion[6] favored weaning after the 18th month, so that the infant would develop strong teeth. He described a glass feeding-bottle for administration of fluids. This could perhaps be used also for other liquids and for diluted solid foods.

Let us see how these feeding bottles looked. Several have been found in children's graves all over the Greek mainland and in Cyprus.[7,8,9] They have a more or less homogeneous form and a handle, with an average height of 5-5.5 cm., and a diameter of approximately 5.5 cm. The opening through which the bottle was filled has a diameter of 2.5 cm., while the spout for sucking has a diameter of only 0.4 cm. The bottles are made of clay and painted black. Several are decorated on top.

Fig. 1. Feeding-bottle of the fifth century B.C. found in a child's tomb in Mihalitsi, Preveza. Archaeological Museum of Ioannina.

Their shape and form, characteristic of excellent Attic pottery, raised doubts as to whether these objects were indeed used as feeding-bottles. However, the fact that most of them were found in children's graves, together with dolls and toys, confirms the belief that they were used for children.

Feeding-bottles have been used since prehistoric times. Lacaille[10] reported several objects used for the feeding of infants and

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Fig. 2. Feeding-bottle of an "Attic laboratory," fourth century B.C. Benaki Museum, Athens, No. 22480.

found in ruins of prehistoric settlements. Compared to those reported here (Fig. 1-3), they were primitive and simple. The type reported here was also used in Hellenistic Egypt and in Palestine. Kern[11] mentions twenty-five feeding-vessels of this kind recorded in the literature. The Museum of Ioannina (Yannina) in Greece displays three, of which two are prehistoric, from the regions of Vitsa and Dodona. The Benaki Museum in Athens has nine Attic feeding-bottles of the fifth and fourth centries B.C. (inventory numbers 22472-22480). There are, of course, many others in museums and private collections.

ACKNOWLEDGEMENT

The author is indebted to the archaeologists Mrs. Ioulia Vokotopoulou and Dr. Lila Marangou for suggestions and for permission to publish the photographs of the feeding-bottles.

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An Experimental Base for Paleopathologic Diagnosis*

By MICHAEL R. ZIMMERMAN, M.D., Ph.D.†

Disease and death are an integral part of the history of individuals and of whole populations. Paleopathology, defined as the study of disease which can be identified in ancient human and animal remains, aims at improving our understanding of the evolution of diseases and their role in biological and social history.

There has been much speculation on the role of disease in human evolution and microevolution. Pathogenic organisms and the patterns of disease that they cause evolve just as do larger organisms, including the hosts and vectors of disease. The clearest example of the evolution of a disease is the relatively recent development of *falciparum* malaria in Africa. The clearing of land for agriculture produced an environment favorable to a species of mosquito which happened to be a more efficient vector of *Plasmodium falciparum.* The result was an increase in this type of malaria and a decrease in the other forms of the disease. The increase in *falciparum* malaria resulted in a selective pressure for the protective sickle-cell mutation, a disease evolving because of another disease.

In contrast, there is evidence of considerable stability in some other host-parasite relationships. Similar parasitic infestations have been found in Egyptian mummies and in modern Egyptians. There is also a significant degree of similarity or actual identity of a number of infections in human and non-human primates despite millions of years of divergent evolution of the respective genera.

The study of diseases over time requires information on ancient patterns of disease; this can be obtained from several sources. Our present concept of the distribution of diseases in past populations is based primarily on historical records such as the Egyptian medical papyri and the accounts of the great epidemic outbreaks in medieval Europe. Works of art including paintings, pottery, figurines and religious statuary, and figures and faces on coins all have given evidence of disease.

Examination of skeletal material and mummies yields the most reliable information on paleopathology. As most diseases leave little or no direct mark on the bones, mummies — defined as bodies preserved either naturally (as by freezing, drying or tanning) or artificially — hold a much greater potential for paleopathologic examination. Autopsies can be performed on mummies, and the diagnosis of many conditions can be made with relative confidence and accuracy.

On the other hand, the microscopic diagnosis of pathological conditions in modern surgical and autopsy specimens often presents great difficulties, even to the most experienced pathologist. These problems are immensely magnified when the subject of a postmortem examination has been dead for several hundreds or thousands of years. Some degree of autolysis is inevitable before the proteolytic enzymes of the tissues and invading bacteria and fungi are inactivated by

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the process of mummification. In fresh tissue, bacteria and fungi can be recognized as postmortem invaders by the absence of inflammatory reaction, but such reaction can be very difficult to recognize in mummified tissues. Even the underlying structure of the tissue may be difficult to recognize, depending on the adequacy of mummification.

Rehydration of desiccated tissue is based on the use of Ruffer's solution, which contains water, alcohol, and sodium carbonate. When the rehydrated tissue is processed in the same fashion as fresh tissues, the artefacts of rehydration are compounded upon those of decomposition and desiccation. As an approach to these problems I undertook a study of the changes seen in experimentally mummified and rehydrated tissues, both normal — these have already been reported in the *American Journal of Physical Anthropology* — and with known pathologic conditions. After removal from human cadavers the specimens were dried in ovens, rehydrated, and examined microscopically in comparison with sections from fresh tissues, in an effort to delineate the changes in appearance produced by these processes.

Briefly summarized, the procedure involved the collection of specimens from grossly abnormal tissues in cadavers undergoing postmortem examination, all within twenty-four hours after death. The various lesions were selected as being representative of several broad classes of disease, including inflammatory and degenerative disorders, disturbances of circulation, and neoplasms. Most of the common disorders of the major organs were included.

After the specimens were bisected, a half of each was immediately fixed and sectioned, as a control. The other halves were oven-dried for one to two weeks at 40° C (104° F), being reduced by this process to dry, dark brown chips which had approximately 10% of their original weight. The specimens were then rehydrated, fixed, and sectioned. The slides were coded numerically and, to limit the bias of the observer, were not examined until several weeks or months had passed after their preparation. The slides of the mummified tissue were examined first and were then compared to the fresh tissue slides.

Inflammatory processes were found to be poorly preserved. As acute inflammatory cells contain proteolytic enzymes, this change could be expected, and mummified neutrophils degenerate into basophilic granular material as seen in an example of pneumonia. Similar findings are seen in a section of a thoracic blood vessel from the mummy of an American Indian. The red cells are well preserved, while the neutrophils are reduced to granular debris. Microorganisms remain well preserved, particularly fungi. A candida abscess of the lung is seen fresh and mummified and the specimens of candida from a 1600-year-old Eskimo cadaver are equally well preserved.

Degenerative processes were preserved somewhat better. Mummification preserved well such disorders as fatty change of the liver and cirrhosis. Anthracosis, seen in almost all humans and caused by exposure to smoke from various sources, was seen well in the lung, as it has been seen in mummies from Egypt, Alaska, and other areas.

Atherosclerotic changes were well preserved, calcification and cholesterol clefts being easily seen in the mummified material and in actual mummies. Sclerotic vessels are of course subject to thrombosis, and a thrombosed coronary artery could be diagnosed only by the use of the phosphotungstic acid hematoxylin stain, which showed preservation of the fibrin meshwork of the thrombus even though the details of the cells were lost.

The result of such coronary artery disease is

often myocardial infarction, and it was a disappointment that acute infarction could not be recognized. Infarction is in essence a process of *in situ* autolysis, the lesion being surrounded by an acute inflammatory infiltrate. In the tissue examined, the mummified necrotic muscle could not be distinguished from the adjacent autolyzed myocardium, and only a few fragmented neutrophils could be tentatively identified. However, the scarring of a healed infarct could be recognized easily, especially with the trichrome stain.

The accumulation of hemosiderin pigment, as in chronic passive congestion, was also well preserved, as demonstrated by an iron stain of the spleen. This pigment is also well seen in actual mummies, as in the case of an Egyptian child with repeated pulmonary hemorrhage secondary to tuberculosis.

Both primary and secondary malignancies were included in this study. One of the most common primary tumors in modern industrial populations is carcinoma of the lung. A specimen of undifferentiated small-cell carcinoma, totally replacing the lung, was well preserved by artificial mummification. Other tumors showed variable degrees of preservation, those of the intestinal tract being severely autolyzed. Metastatic tumors were quite well preserved, as seen in a colonic cancer metastatic to the liver, and in an ovarian cancer, metastatic to the diaphragm, with its characteristic psammoma bodies. The large hyperchromatic cells of the tumors are better preserved than those of the adjacent normal tissues. *I cannot show any slides of cancers from mummies; there are none.*

The experimental procedure produces changes generally similar to those seen in actual mummies. Preservation was somewhat better, as actual mummification is probably a more erratic process. Variability was seen in the preservation of different tissues and different morbid entities.

Acute inflammatory cells are self-destructive, while chronic inflammation seems to be better preserved. Microorganisms are especially well preserved, although it may be difficult to determine whether pathogens or postmortem saprophytes are present in a given case. Degenerative processes are quite well preserved. These disorders are often characterized by the accumulation of various foreign materials and tissues which tend to be remarkably inert and persistent. Examples are fat, cholesterol, various pigments, and fibrous tissue.

The diagnosis of *acute* myocardial infarction in mummies is an unsolved problem. We are warranted in expecting *healed* infarcts to have been preserved, but it is possible that in antiquity most sufferers from coronary artery disease succumbed to acute infarction, and, as I have explained, this is a diagnosis that we cannot make in mummies.

In this study, malignant tumors were found to be better preserved by mummification than normal tissues. One of the great questions in paleopathology is the relative rarity of reports of tumors. There have been only two reports of benign tumors: Sandison's report of a small squamous papilloma of the skin and my report of a dermatofibroma. Both of these occurred in Egyptian mummies. No microscopic section of a cancer in a mummy has ever been published.

This scarcity of tumors has been attributed to early death of individuals in antiquity, before the "cancer age," or to inadequate examination or poor preservation of the material. While over-all life span was short in antiquity, this was to a great extent a statistical phenomenon due to high infant mortality; many individuals lived long enough to develop other diseases of the aged, such as atherosclerosis, Paget's disease of bone, osteoporosis, and arthritis. Also, bone tumors are most common in modern

populations in the second and third decades of life; and their rarity in the many ancient skeletons examined probably represents true scarcity.

My experimental study indicates that the failure to diagnose cancer in mummies is not a result of poor preservation, and suggests that the incidence of cancer in ancient material is truly (and astoundingly) lower than in modern populations.

The literature contains few references to the antiquity of cancer. The crab-like nature of malignant tumors (from which the name "cancer" derives) was only noted by the Greeks about 500 A.D., although there are some older references to various tumors. Some cancers were first described only in the relatively recent past. These include multiple myeloma (1840-50), carcinoma of the nasal passages in users of snuff (1761), and a variety of occupational tumors in the eighteenth, nineteenth, and twentieth centuries. These tumors are distinctive clinically and pathologically, and their late description suggests infrequency of occurrence until recently.

Whatever the vagaries of the older medical literature are, the fact remains that there is not a single instance of a tissue diagnosis in mummies of any of the myriad cancers which afflict our modern populations. My experimental study suggests that such tumors could be diagnosed if they were present and implies that carcinogenic factors existing in the modern world were absent in antiquity.

A Discussion of Dr. Michael R. Zimmerman's Paper, "An Experimental Base for Paleopathologic Diagnosis"

By SAUL JARCHO, M.D.*

Dr. Zimmerman's experiments are likely to provide a strong stimulus to research in paleopathology and are likely to be well received by students of the subject.

In any future experiments on mummification much will depend on which purpose is chosen. Will the purpose be to study the effects of prolonged spontaneous desiccation such as occurred in Peru, Utah, and North Africa, or to reproduce the results obtained by the ancient Egyptians, or to imitate some other ancient or prehistoric technique? It can be assumed that the methods will be modified to suit special purposes and that they will become increasingly complex. Whatever is done can be expected to yield new and interesting observations. Dr. Zimmerman has used thermal desiccation and subsequent restorative rehydration. His work tends to show what kinds of lesion can or cannot be recognized in tissues dried by heat. He has found, for example, that chronic passive congestion can be detected but myocardial infarction cannot.

It is worth noting that Dr. Zimmerman's astonishing investigation has precedents. With some difficulty I have been able to group these in three categories.

1. During the Middle Ages and Renaissance mummy was used as a drug. It was applied to wounds, ulcers, and fractures, and was taken internally for numerous ailments, including vertigo, hemoptysis, palpitation, and poisoning. It has been shown[1] that the use of drugs designated as mummy passed through several developmental stages, of which the earliest was the use of asphalt and pitch, derived from natural sources. Somewhat later came the use of asphalt and pitch mixed with myrrh and other aromatic substances, the mixture consisting of material obtained from embalmed burials. A further development was the use of fragments of the embalmed cadaver itself. Each of these products, including the earliest, namely asphalt, was called *mummy,* the word being of Persian or Arabic origin.

The great popularity of mummy derived from preserved Egyptian cadavers led to counterfeiting, ordinary cadavers being treated with preservatives and sold as genuine mummy. We may characterize this as the surreptitious or *fraudulent* type of mummification.

2. The use of mummy also came to be practiced widely in what may be characterized as reputable or *official* pharmaceutical circles. An example is found in the *Basilica Chymica* of Oswaldus Crollius.[2] This Paracelsian treatise on pharmacy passed through numerous editions in the early seventeenth century. Here, in English translation, is the beginning of Crollius's recipe for Theriac of Mummy:

> Let tincture of mummy be prepared first, in the following manner. Let the intact, fresh, and unspotted body of a red-haired man twenty-four

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> years old be chosen who had been hanged or broken on the wheel, or speared, and let it be collected by day or night in calm weather. This mummy, after it has once had exposure to the two luminaries, you should break into pieces or chips, and sprinkle it with powdered myrrh and only a little aloes —otherwise it becomes too bitter — and then it should absorb through maceration for several days in spirit of wine. Then let it hang a little while and again be immersed. Finally allow pieces hung up to dry in air . . .

Another Paracelsian, Nicasius Le Febre [*alias* Le Fevre and Le Febure] wrote[3] "The Mummy which is prepared out of the Flesh of Man, is one of the noblest Remedies which all the parts of his Body can afford." He then describes four kinds of mummy, similar to those mentioned above. Finally he adds[4]:

> But, because those dead bodies so dryed, are not still to be recovered. . . the ingenious Artist may substitute a fifth kind of Mummy. . . which may lawfully be also called the Modern Mummy, which you may prepare in the following manner. . . Take some young lusty man's body, of about 25 or 30 years of age, dead by suffocation or hanging, and dissect the Muscles. . . and being thus separated, dip in sp[irit] of Wine, and suspend. . .

3. The third *experimental* type is represented by the work of Guillaume-François Rouelle[5] (1703-70), Lavoisier's teacher and a notorious scatterbrain, who in 1750 informed the Académie Royale des Sciences that he had attempted to imitate Egyptian embalming. He planned to report his results, but the promised statement apparently was never published. Rouelle was intending to preserve specimens for anatomical study. It is clear that Dr. Zimmerman's experiments belong in this category.

Also on record is a paper published in 1887 and containing observations and experimental notes on mummies found in central Italy[6]. I have not yet had access to this publication.

With respect to the alleged absence of cancer in mummies, great caution is necessary. In the first place, the researches of recent years have revealed that many kinds of cancer are caused by chemicals produced industrially. We are therefore predisposed to believe that these kinds did not occur in antiquity or occurred rarely. This places us in the position of trying to prove a negation, a weak position in logic and in natural science.

One gap in existing evidence should be pointed out. We know that the ova of schistosomes are found in Egyptian mummies. We know that in contemporary Egyptians visceral schistosomiasis produces cancer, especially of the urinary organs. With this evidence we are entitled to suspect that cancer of the bladder occurred in ancient Egypt, whether or not this lesion has been detected in extant specimens. A new study of the question is indicated, and would doubtless be helped by ingenuity such as Dr. Zimmerman has shown. The study should include not only reexamination of anatomical material, but a consideration of demographic data (especially with regard to length of life), and also search for records of hematuria. It will be remembered that large numbers of Egyptian ostraka are now being discovered and interpreted.

At least one other aspect of Dr. Zimmerman's investigation requires comment. This is the possibility that his work will yield information of medicolegal importance, especially in the examination of exhumed bodies or in the study of tissues that have been subjected to unusual types of chemical or physical assault. While one does not ordinarily think of paleopathology as a subject that is likely to produce practical results, at least one precedent should be mentioned. Prof. Villem Møller-Christensen[7] of Copenhagen, while studying the cemeteries of medieval Danish leprosaria, discovered that the skulls showed atrophy of the anterior nasal spine of the maxilla. He then found the same alteration in living lepers, with the result that a new clinical sign was added to the diagnostic repertoire. Conceivably this new sign could even prove to be of medicolegal importance.

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John D. Quackenbos, M.D. (1848-1926): A man for all seasons.

By ROBERT W. CULP, M.L.S.*

In the State of New Hampshire, on a remote stretch of country road bordering Lake Sunapee, stands a roadside marker. The inscription reads:

> Between this road and Lake Sunapee, in 1892, John D. Quackenbos, M.D., (1848-1926) began his "Soo-Nipi Park" development. It then comprised 400 acres of land from the historic Currier and Pike farms, and extended for almost two miles along the lake shore. So carefully planned was its growth that Dr. Quackenbos has been termed a "pioneer of zoning" for our nation. Soo-Nipi Park included a guest house, individual cottages, a golf course, tennis courts, horseback trails, foot paths, a steamboat landing, a fish hatchery, and a wildlife sanctuary. Dr. Quackenbos was one of the founders of Barnard College in New York City, and became a prolific writer on literary and medical subjects. Becoming a legal resident of New London in 1897, in ensuing years he served on the Library Committee, the Board of Health, and the School Board. A truly dedicated citizen.

This New London marker, inscribed with the name of Dr. Quackenbos and honoring his accomplishments, provided motivation for this paper.

John Duncan Quackenbos lived seventy-eight years. In the pursuit of his livelihood he functioned first as an educator, lecturer and editor, then in later years as a psychotherapist. His interests were many and varied. He was an avid sportsman, a naturalist, a geographer and an historian. Whether involved because of vocation or avocation, his enormous energy, vitality and curiosity seldom failed to elicit a zest and enthusiasm for life and the world about him. "There was," as his neighbors observed, "nothing in the world he wasn't interested in." Quite apart from all of these substantive interests was his deep and abiding love for the lakes and mountains of the Sunapee area, for his New Hampshire neighbors, and for the town of New London.

Dr. Quackenbos was born in New York City on April 22, 1848. The family name derives from the Dutch 'Van Kwakkenbosch' which was in time modified to Quackenbos or its variants. One member of this Dutch patrician family, Pieter, emigrated from Oestgeest in Holland about 1650 or 1660, together with his wife Martje and son Reyner. The family settled in Albany where eight additional children were born. From Pieter, himself educated at the University of Leiden, the Quackenbos family grew and prospered in America. There were at least two early physicians in the Quackenbos line, John Van Pelt (1819-76) and George Clinton (1784-1858), John's grandfather.

At John's birth, his mother Catherine Payne Quackenbos and his father George Payne Quackenbos lived in New York City. George had intended to become a lawyer, and had in fact begun legal studies, but teaching and writing were far more appealing. Law school was discontinued. Instead, George established and became principal of the Henry Street Grammar School of New York in 1867; eight years later he became rector of the Collegiate School in New York.

Despite a seven or eight hour teaching day, George found time to contribute to many newspapers and magazines and to assume for several years the editorship of a journal called *Literary American.* His natural affinity for this type of work prompted George to enter upon a lifelong career as an author of children's schoolbooks. These included texts

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in composition, rhetoric, history, 'natural philosophy', geography and arithmetic. In these books he sought to infuse life and interest into subjects and to make them attractive as well as useful, rather than tedious and dry. His texts were highly successful and closely imitated. *First Lessons in Composition,* brought out in 1851, sold 400,000 copies and was even reprinted in the Confederate States during the Civil War. George was also noted for his editorship of the Spiers and Surrennes' French dictionary.

John D. Quackenbos.

At the height of his literary career George Payne Quackenbos was honored by Wesleyan University, which conferred upon him an honorary law degree in 1863. Despite failing health, the last years of his life were spent in almost ceaseless literary work, punctuated by annual summer vacations in New London, New Hampshire. On one such visit he suffered a carriage accident and died in New Hampshire in July, 1881; his death was attributed to heart disease complicated by the shock of the accident.

Those annual vacations to New Hampshire with his father, mother and sister crystallized for the sixteen year old John a profound and enduring love for the area. A city-bred boy, he had never seen such mountains before. With the energy and vitality of youth he and a group of country boys raced one day to the top of the Kearsarge Mountain from which they could count thirty bodies of water. One, a silver ribbon to the west, was called Big Sunapee Pond. "That beautiful thing a pond?" John could not have known that to the White Mountain people the term 'lake' was reserved solely for one, Winnepesaukee. For many summer visits the family boarded with local people until 1874, when father and son crossed the mountains from East Andover to reach the shimmering waters of Sunapee. One year later a rustic cabin was built on the beach where there was "nowhere a cottage or camp — no anything — Nature and nothing more."

By this time young John was deeply involved with academic studies. First he attended the Collegiate School where his father was rector, and then, in 1868, when he was twenty, earned his B.A. degree with first honors from Columbia College. In March 1871 he completed three years of medical lectures, hospital practice and summer sessions and received his M.D. from the College of Physicians and Surgeons of New York City. Yet this was not all. With the characteristic energy of his father, John had simultaneously enrolled in the graduate program at Columbia College, tutored there in rhetoric and history under President

Barnard, and was awarded his M.A. in English in June. That same month John married Laura A. Pinckney of New York.

It was an exhilerating moment for a young man in his early twenties. A lifelong friend, Nahum J. Bachelder, later Governor of New Hampshire, fondly recalled his impressions of John at Sunapee:

> Dr. John D. Quackenbos was about the livliest person that ever struck this community....We went to Sunapee Lake repeatedly and brought back splendid strings of black bass....I recall one day when Dr. Quackenbos tore his clothers so badly that he had to sneak up the back stairs to his room. He was a great tease, and I remember how he enjoyed putting horse hair into his sister's bed, and on another occassion hiding under the bed to move it across the room after she was in it.[1]

John's mother saw her irrepressible son in a somewhat different light — as a young man of enormous energy, new ideas and activities which kept her saying "Please be careful, John...John, please don't do that...You really shouldn't have said that, John."

A moment of decision was at hand for the young couple. John would have to choose a career, either as a physician or in the scholastic work already well begun at Columbia. The fame and reputation of John's father as a writer of school texts had made him much sought after as a lecturer, but left little time for the editing of educational books. John decided to continue teaching at Columbia and to assist his father in editing. By 1876 both father and son were under contract to Appleton. John's first textbook, *School History of the World,* was followed in the next two decades by at least a dozen others, encompassing the fields of ancient literature, geography, English language, ancient history and physics. Many of his texts were periodically rewritten or revised. His teaching program at Columbia was augmented with lectures in English literature, and utilizing his medical training, with instruction in physiology and psychology.

The biological imperative was met; Alice Pinckney (1872), Carrie Duncan (1877), and George Payne Quackenbos (1879), named after grandfather, joined the family. Unfortunately the little boy was scarcely two when grandfather's accident and subsequent death occurred. This event was a blow to the young family. The added responsibilities and pressures of work thrust upon John to complete his father's unfinished manuscripts drained his energy and reserves to the point of exhaustion, and he was ordered to take a recuperative trip to Europe. Although not immediately apparent in his activities when he returned home fully recovered, the influence of European psychotherapists whom he met was instrumental in patterning his medical career after 1894.

The quality of John's academic work and his prodigious energy did not go unnoticed at Columbia. In 1884 he received an appointment as Adjunct Professor of English Language and Literature; by 1890 he had attained the rank of Professor in the University Faculty of Philosophy, and one year later was simultaneously named Professor of Rhetoric at Columbia and Barnard. Although the collegiate work received the major share of John's efforts, he did not completely abandon his connection or interest in medicine. He was elected a Fellow of the New York Academy of Medicine in 1884 and served there as a lecturer in physiology and dietetics.

Summers and Sunapee were synonymous. John was a self-taught naturalist who could identify all the plants, animals, rocks, minerals and geological formations in the area. Two adjoining farms bordering the Lake were purchased, and between 1883 and 1885 Soo-Nipi Lodge and Soo-Nipi Park were begun. The Lodge consisted of two ample buildings providing excellent vacation accomodations in an unspoiled rustic setting with a sandy beach framed by tall pines. The Park, comprising 400 acres and two miles of

shoreline, was laid out with great foresight, incorporating many elements of community planning still seen today as a model of excellent zoning.

> Four miles of drives through the 400 acres were built, three of brookside walks, and ten miles of foot and bridle paths. These, and the lots he leased or sold, were all placed so that the natural beauty of the woods, beach and natural terrain were preserved. One can even see the new concept of cluster zoning in the plan. Four or five houses are built quite close together, so that the surrounding park and woods were available to all.[2]

In the convenant which was a part of each lease or sale of land in Soo-Nipi Park in 1892, there was an uncompromising attitude toward the sovereignty of natural resources. There could be no railroad depot, smith shop, foundry, bone-boiling establishment, distillery, saloon, tenement houses, 'disorderly houses', or buildings used for immoral purposes of any kind on the Park land.

In the early 1880s Lake Sunapee was virtually unknown outside the state, but events soon altered that. Around 1883 the Massachusetts-New Hampshire Fish Commission visited the area to establish a hatching station for artificially propagating native lake trout. With the enthusiastic cooperation of John Quackenbos, Soo-Nipi Park was selected as the site, and John was given full jurisdiction for some aspects of its supervision. The same uncompromising attitude toward immorality of any kind, toward Sabbath desecration, toward exclusion of "coarse and otherwise undersirable elements of society" at the Lodge was to characterize the life of employees at the hatching station. "Fish-catching and fish-hatching at Soo-Nipi Park shall be carried on in an atmosphere pure enough for the most sensitive to breathe."

The fishing fever burned brightly at Sunapee as the result of two events: John's discovery at this time of the American saibling, a golden trout, a species of char not known to exist in America, and his success at introducing the Loch Leven trout of Scotland into the waters of Lake Sunapee. It was now claimed that Lake Sunapee was the greatest fishing resort in New England or the Middle Atlantic States.

After two decades of literary work and twenty-four years of teaching, John D. Quackenbos made a mid-career change. In 1897 he became a legal resident of New London, and a year later resigned his Professorship at Columbia. Apparently the decision to leave was mutually agreeable. Columbia had begun to view with skepticism his beliefs in hypnosis which had had their inception in his European trip years before, and which now fired his interest. Also, Columbia was piqued by his outspoken views on religion. In a series of lectures in New York City in the late nineties Dr. Quackenbos spoke of the preeminence of Christianity over the so-called revived Oriental religions and the 'isms' of the day.[3] In his view, the Christian Scientists were among this number, and his antipathy undoubtedly alienated many people.

As a first step in the rehabilitation of his medical career, Dr. Quackenbos attended the Post-Graduate Medical College in New York in 1894, where he enrolled in lectures designed to update his medical expertise. He resumed practice, specializing in the control of mental and moral abnormalities. He wished to be a practicing psychotherapist, to treat those afflicted with nervous and mental disorders, drug problems, alcoholism and speech defects. He believed that just as the mind influences the body to produce certain illnesses, so it influences somatic recovery. The use of psychotherapy — suggestion to the subconscious under light hypnosis — would ameliorate certain conditions in amenable patients, depending upon the patient's desire to be cured, his faith in the doctor and the degree of his illness. The 'suggestionist' must

believe that the patient is curable and reinforce this belief by repeating over and over again to him that the problem is under control and will not recur. In an early paper on the treatment of neurasthenia, Dr. Quackenbos notes that where all drugs fail, the course of the illness can be altered by post-hypnotic suggestion. "The psychical treatment consists in securing the confidence of the patient and making him believe that he is curable — that there is a time ahead when he will be entirely well again; but that he must have faith and not be discouraged at the chain of relapses which mark the course of the disease."[4]

Beyond the psychotherapeutic approach to physical disease, alcoholism and drug abuse, he was concerned with the transformation of character. Dr. Quackenbos believed that mental suggestion could be a moralizing and spiritualizing force and that control and development of dormant ability through psycho-physical control was likewise achievable. From 1898 until the end of his medical career almost thirty years later, his medical writings substantiated these concepts and beliefs.

Since he was now a legal resident of New Hampshire, one could assume that Dr. Quackenbos would direct his interests and energies to concerns of the Granite State, the Sunapee area and the community of New London. Among other activities, he participated in the Society for the Protection of New Hampshire Forests, attained its vice-presidency, and spoke at annual forestry conferences; he convened the Lake Sunapee Protective Association to help insure the purity of the Lake's water; in New London he served on the Board of Trustees of Colby Academy and lectured there; he chaired the Board of Library Trustees, the School Board and the Board of Health. In his role as one of the founders of the St. Andrews church in 1898, Dr. Quackenbos's presence was so deeply felt that the rector called St. Andrews "his church." Yet "he" was not a regular churchman. There was a strong suspicion that some Sunday mornings were spent instead with rod and reel on the Lake. Despite the offended sensibilities of a few, community approbation for Dr. Quackenbos was never greater. They said of him:

> He has for the lake a heart of love, and is interested in everything which makes for improvement. His efforts are characterized by an absolute unselfishness, and include doing his utmost for the permanent residents of all the towns on the lake border.

Certainly the communities were in awe of his dedication and energy. They observed that

> In Newbury he holds religious services during the summer months, in New London he gives free lectures; both have the benefit of his knowledge of hygiene and medicine. For the whole region he makes maps, and assists in the preparation of gazetteers and guide books. For the denizens of the lake itself he fights valiantly until he secures the recognition of a new species of trout, which he loyally christens the Sunapee saibling from the crystalline waters of its birthplace. Each year his ceaseless activity finds new outlets, fresh benefits are conferred.[5]

From time to time, by the very nature of his practice, Dr. Quackenbos came into the public eye. In December, 1901, a young actress who suffered from stage fright sought his help. As he reported before the Medico-Legal Society of New York, she made two visits, and at each he suggested to her that she was the actual character she was to portray. "After two sleeps she became imbued with absolute confidence and, refusing a third treatment, went before the footlights a consummate mistress of her art. She was not in a trance the night she made her first appearance, and I was not even present in the theatre, but the subliminal force in her being had been made for the time the dominant force, and her self-consciousness was completely obliterated." The newspapers and Harpers Weekly were much impressed with the story.[6]

At another time Dr. Quackenbos was

called to treat a young choir singer who was critically ill. Her physician, after consulting with five colleagues, informed the patient's family that the poor girl had only four hours to live, and withdrew from the case. Dr. Quackenbos, whom the patient had seen only once before at a distance, was summoned to the case. In the patient's words:

> Dr. Quackenbos came to me, took my hand, and in a firm, decisive voice called out, "Adele, where are you going? Come back, you cannot die. You have work to do on earth. It is not finished yet. Come back at once." I remember distinctly murmuring, "too late." "It is not too late," he said. "Come back. I command you." I turned my head to see who spoke to me, and I said, "That is the face." I turned my eyes, I fell asleep, to wake with the crisis past.

After her recovery the patient recounted in detail the bizarre aspects of her delirium and concluded:

> I don't want to underrate the splendid efforts of my own physician and those who had the case in consultation with him. They brought me through after the crisis, but on the other hand there is no doubt in my mind or in the minds of my friends that if Dr. Quackenbos hadn't appeared at just that critical time I should not be here.
> I am quite satisfied that he recalled me to life by imbuing me with the wish to live and the fact that I still had work to do.[7]

Dr. Quackenbos made the New York papers on still another occasion. He had been named as a defendant in an action brought by his sister and aunt to eliminate him from the trusteeship of a fund left by his mother. In the course of the hearing which occurred in December, his aunt successfully eluded all her nephew's attempts to have her testify. Dr. Quackenbos, knowing that his aunt customarily received a mince pie from a friend at Christmas, managed to have a trusted messenger deliver the pie to his aunt with the summons resting atop the upper crust![8]

By the early 1900s Dr. Quackenbos had achieved a worldwide reputation for his experiments in psychotherapeutics and for his work in psychophysical control through hypnosuggestion. His practice was extremely large and diversified, necessitating office hours from 9AM until midnight. Some of his writings were translated into Japanese so that Japanese physicians might emulate his methods. The American College at Kerasunt, Turkey had all of his books on hypnotism translated into Armenian for the use of that nation's people. In addition, after 1900 Dr. Quackenbos reported extensively in medical journals on his clinical and theoretical work in psychotherapeutics.

In 1896 a fourth and last child, Kathryn, was welcomed into the family. When Kathryn was barely thirteen the marital bond of thirty-eight years between John and Laura was broken with Laura's death in 1909. Dr. Quackenbos remained a widower for a number of years, but at age sixty-eight he married Louise D. White, who was considerably younger than he. Together they built a new home in New London amid friends and neighbors, utilizing Soo-Nipi Lodge for its income and for their personal enjoyment. Facilities at the Lodge had been painstakingly expanded and improved over the years so that it was now one of the best appointed (and most expensive) resorts on the Lake. Dr. Quackenbos had long since given over its management and supervision to others, but he relished renewing the friendship of loyal patrons. At a later date he recounted a particularly memorable incident which he cherished:

> A friend who was coming up here inquired, through his secretary of a man in Newport whom the latter knew, about the region and he said by way of a joke, "Incidently, ask your friend whether he is acquainted with Dr. Quackenbos," and came back the reply, "Lake Sunapee is God's own country, but that Dr. Quackenbos is a damned old crank on air, water and bath tubs." "That's just what I'm looking for" remarked my friend and his daughters are enjoying the 26th summer at the Lodge.[9]

Due to the increased size of the Lodge and the economic pressures of World War I, the Lodge was offered for sale around 1918, when Dr. Quackenbos was seventy. What better

moment for him to venture upon an entirely new field of endeavour? Dr. Quackenbos combined his literary talents with his medical expertise and turned novelist. *Magnhild* was a psychic love story, laid partly in New York City and partly at Lake Sunapee, and is based upon the author's more than twenty years of practice. As stated in the forward, the story is "an analysis of the tender emotions in its higher subconscious inception and derived bodily expression, and in such portrayal combines romance and reality in equitable proportions." Its autobiographical quality can be inferred from the author's contention that a psychiatrist should be "a man of right living, wise judgment and declared principle as well as a carefully educated man, proficient in the physical sciences and well read in literature, experienced, conscientious, and exemplary in his daily life." Modesty was not one of the novelist's outstanding traits.

If Dr. Quackenbos was not particularly modest by nature, neither was he deferential toward those who failed to share his views. Detractors of psychotherapy seldom escaped his acerbic comments. Physicians were dealt with rather gently: "hypnotherapy is trivialized by many medical men who know nothing of its philosophy and possibilities...," but others were labeled illiterate mountbanks, religious fanatics, 'new-thoughters', mystics, cultist addle-pates or insensate fanatics. Yet Dr. Quackenbos was not committed solely to psychotherapy, excluding all other treatment modalities for his patients. After nearly three decades of practice he freely acknowledged the value of chemotherapy and diagnostic procedures such as radiography and was willing "to defer to them all when need be with the aid of collaborators." However, the core of his medical beliefs was firmly rooted in the psychotherapeutic approach.

> I am persuaded that there exists in human beings a mass of latent unused power — a reserve fund of energy, which is applicable to emergencies, to extraordinary demands on the fortitude, exalted control, innate aptitude, or regenerating faculty of the individual. It is this power that may be incited to control the psychic elements in all diseases, and so effect the cure of those that are functional and the alleviation of suffering in those that are organic. It is this power that commands the output of thought, the projection of genius, the material expression of all that is best in the man. It is this power which, dynamically directed and applied, regenerates the outcast, sobers the drunkard, rescues the drug-fiend, restores to normal thought and feeling the distraught and suicidal, the perverted and the obsessed.

This energy — he calls it 'abeyant efficiency' — can be harnessed through the use of suggestion.

> The object of suggestion is to establish self-control in physical, mental or moral relaxation; to impart pluck, push, nerve, self-reliance to the mortal mind; to strengthen the will; to bring into personal touch with the truth, which always emancipates. Suggestion, in other words, makes efficient and efficiency in a state of perfect action is happiness.[10]

The principles set forth above were published in February, 1926 in a paper which marked the end of his productive years. Dr. Quackenbos celebrated his seventy-eighth birthday that April. During the summer, while at the Lake, he wrote once again to Nahum J. Bachelder, his friend of over fifty years — Nahum, with whom he had first explored the New Hampshire lakes and mountains when they were both young men. His letter ends "God bless you, dear Nahum, and come and see me once more. I am in my 79th year." Exactly one week later, on August 1st, a cerebral hemorrhage ended his life.

A final note. The early 1900s had been the heyday of Soo-Nipi Park and the Lodge. However, after the 1929 crash and the ensuing depression, neither again attained its former preeminence. By the end of World War II, changes in travel and vacation patterns of Americans had rendered the Lodge unprofitable. The fish hatchery station ceased activity in the 1940s; the Lodge and Soo-Nipi Park closed in the 1960s, its buildings neglected and deteriorating within the encircling pines. In 1970, on the country road

bordering the Lake, the community of New London erected a roadside marker to acknowledge the man, the place, and the moment. Nothing is permanent except change.

ACKNOWLEDGEMENT

To Mildred C. Tunis of New London, N.H., for her unflagging interest and unstinting cooperation, my warm and sincere thanks.

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APPENDIX

Following are listed the writings of John D. Quackenbos.*

1876. *Illustrated school history of the world, from the earliest ages to the present time; accompanied with numerous maps and engravings.* New York: Appleton.

1878. *Illustrated history of ancient literature, oriental and classical, accompanied with engravings and colored maps.* New York: Harper.

1879. *Illustrated school history of the world from the earliest ages to the present time...Revised edition.* New York: Appleton.

1880. *Appleton's American standard geographies. Elementary geography.* New York: Appleton.

1881. *Appleton's American standard geographies. Higher geography.* New York: Appleton.

1882. *History of the English language.* (IU)

1884. *Elementary history of the United States...by G.P. Quackenbos...revised by J.D. Quackenbos.* New York: Appleton.

1885. *Advanced course of composition and rhetoric...by G.P. Quackenbos, revised and corrected by J.D. Quackenbos.* New York: Appleton.

1887. *Physical geography: prepared on a new and original plan.* J.D. Quackenbos, et al., eds. New York: Appleton.

1887. Sunapee Lake trout on their spawning beds. *Am. Angler* 12:282.

1889. *Lessons in geography for little learners.* New York: Appleton.

1889. *Illustrated school history of the world...Revised edition.* New York: American Book Co.

1890. *Illustrated history of ancient literature...New edition, revised and corrected.* New York: Harper.

1891. *Appleton's school physics.* J.D. Quackenbos, et al., eds. New York: American Book Co.

1893. The Sunapee Saibling: a fourth New England char. *Trans. N.Y. Acad. Sci.* 13:139-151.

1893. Our forests and shade trees. *Summer Rest,* pp. 4-5.

1894. *Bovine tuberculosis.* (IU)

1896. *Practical rhetoric.* New York: American Book Co.

1896. *Typhoid fever, its poison, causes, prevention and treatment considered from the standpoint of the householder's responsibility.* (IU)

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1898. Emergency treatment: or, what to do until the doctor comes, Number 21. *Med. Times* 26:65-68. (IU)

1899. *Enemies and evidences of Christianity; thoughts on questions of the hour.* New York: Eaton and Mains.

1899. *Business english.* (IU)

1899. *Field sports as an economic factor.* (IU)

1899. *Post-hypnotic suggestion in the treatment of sexual perversions and general moral anaesthesia: a personal experience.* (IU)

1900. *Hypnotism in mental and moral culture.* New York: Harper.

1900. Educational uses of hypnotism. *Harper's* 101:264-268.

1900. Moral value of hypnotic suggestion. *Harper's* 100:466-473.

1900. *Treatment of the drink habit by hypno suggestion.* New York. (I)

1900. *Treatment of the drink habit by mental suggestion.* New York. (I)

1901. *The mutual relationship in hypnotism and its bearing on telepathic and spiritistic communication.* New York. (I)

1901. *Standing forests in their relation to the public health.* New Hampshire: Society for the Protection of New Hampshire Forests.

1901. Reciprocal influence in hypnotism. *Harper's* 103:110-112.

1901. Story of the brook trout. *Outing* 38:369-373.

1902. *Hypnosuggestion in trained nursing.* New York. (I)

1902. *Suggestion and the Christian minister.* (IU)

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1906. Transliminal. *N. Am. Rev.* 183:237-249.

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1913. The present status of mental suggestion. *Mon. Cyclopedia Med. Bull.* 16:597-601.

1914. The psychical treatment of alcohol inebriety. *J. Inebriety 35: 161-173.*

1915. Arteriosclerosis in its relation to life insurance. *N.Y. Med. J.* 101:999.

*Read at the semiannual meeting, American Society for the Study of Alcohol and other Drug Narcotics, Washington, D.C., 17-19 March.

1916. *Geological ancestors of the brook trout and recent saibling forms from which it evolved.* New York: T.A. Wright.

1916. *Body and spirit: an inquiry into the subconscious, based upon twelve thousand experiences in the author's practice.* New York: Harper.

1916. *Evolution of the brook trout, from prepleistocene ancestors.* New York: T.A. Wright.

1916. The psychologic interpretation of alcoholic intemperance and its physio-psychic treatment. *Med. Times* 44:43-47, Feb. Also: *Alienist Neurol.* 37:1-14.

1918. *Magnhild, a tale of psychic love.* Boston: R.G. Badger.

1918. Kleptomania: its causes and treatment. *Alienist Neurol.* 39:230-232.

1919. Psychic hydrophobia. *N.Y. Med. J.* 109:313, Feb. 22.

1921. *Lessons in geography for little learners.* Revised edition. New York: American Book Co.

1924. "Behavior in its relation to the glands of internal secretion." Read at the College Club of Jersey City, Nov. 5.

1924. *Half a hundred years at Sunapee.* Privately printed, unpaged.

1925. *Rational mind cure.* (I)

1926. The treatment of delinquent glands. *Med. Times* 54:42-44, Feb.

The following papers, each incompletely cited and unverified, have also been ascribed to Dr. Quackenbos. Since each lacks a publication date, they have been grouped together here.

Emergencies and how to deal with them in the family.
Hypnotic suggestion in the treatment of dipsomania.
The psychological proof of immortality.
The psychology of happy marriage.
The psychology of sleep.
The reciprocal influence in hypnotism and its bearing on telepathic and spiritistic theories.
The state care of the insane.
Suggestions in mental and moral culture.
Tuberculosis, its prevalence, communicability and prevention.

Physicians and the Development of Scientific Agriculture, Empiricism to Science 1731-1863*

By EUGENE H. CONNER, M.D.†

Mrs. Shryock, Dr. Parish, Dr. Radbill, Dr. Taylor, Ladies and Gentlemen.

I greatly appreciate the honor bestowed upon me this evening by your invitation to present this, the second annual Richard Harrison Shryock Lecture of the Section on Medical History of the College of Physicians of Philadelphia. I have a feeling of reverence for your great institution and its members, both past and present.

I did not have the good fortune of meeting Doctor Shryock, but through the medium of his writings and those of Drs. Whitfield Bell, Merle Curti and others, I have come lately to know him. I believe his teachings have influenced my thinking as perhaps they have all of yours.

Doctor Shryock pointed out many of the neglected areas in the historiography of science and medicine. He fortunately elaborated upon some and demonstrated new techniques of analysis. In 1939, he made a detailed study of colonial agriculture, comparing methods of husbandry and the work ethics of the English and German immigrants in Pennsylvania, Maryland, Virginia and North Carolina.[1] Another area to which Doctor Shryock devoted attention concerned the American apathy towards basic research in contrast to the enviable record of American applied research.[2] Our subject supplies some examples of both basic and applied research and occasionally their failure for lack of support.

Modern farming in the western world began in the sixteenth century in Flanders and was improved by the Norfolk (County, England) system of crop rotation, the introduction of row planting, and the advent of mechanical tillage.[3] During the century and a quarter from the invention of the horsehoe in 1731[4] until the establishment of a U.S. Department of Agriculture in 1863, agriculture changed from a trade, improved occasionally by empirical discovery, to an established scientific discipline.

There was a body of common knowledge about farming which existed prior to the steps toward a scientific agriculture which we shall consider. In a cursory manner, an estimate of the content of this body of common knowledge is afforded by looking at early book titles on husbandry. In 1953, J. Christian Bay, the venerable librarian of the John Crerar Library, wrote an introductory essay to the reprinting of that extreme rarity *God Speede the Plough* (1601),[5] and it is in this essay that some of the very early books on agriculture are mentioned and their merits briefly presented.

The first English book on agriculture was Sir Anthony Fitzherbert's (d. 1538) *The Boke of Husbandrie,* 1523.[6] This was followed by Thomas Tusser's (ca.1515-ca.1579-85) *A Hundred Good Points of Husbandrie,* 1557,[7] soon expanded to five hundred points in numerous subsequent editions — all written in didactic verse. Advanced views of uses and sources of manures were recorded in Sir Hugh Plat's [Platt] *Jewel House of Art and Nature Containing Sundry Experiments in the Art of*

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*Presented as the second annual Richard Harrison Shryock Lecture of the Section on Medical History of the College of Physicians of Philadelphia, November 16, 1977.

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Husbandry, 1594.[8] This was soon followed by another publication *The Newe and Admirable Arte of Setting Corne,* 1600 and 1601, which is of historical importance for two reasons. The author, Edward Maxby, recommends the use of the plow (rather than the spade) for preparing the ground, and the planting of corn in rows (rather than by broadcasting the seed).[9]

Effecting this transition were a number of gentlemen and at least one lady (Jane Marcet). The background in science of many of these important known contributors was medicine. Some were trained as apprentices and some were university or college trained. Some practiced and cared for the sick and others did not. Most, however, were teachers devoted to learning and very much a part of the enlightenment in the western world.

Medicine, although mostly empirical in the eighteenth century, was a biological science. Since a medical degree was the only graduate degree offered in the sciences,[10,11] it frequently served as a general education for those primarily interested in botany, chemistry, geology, mineralogy and other now separate subjects which then were grouped together as Natural Philosophy. The M.D. degree, conferred or assumed, provided a certain 'respectability' for those gentlemen who wished to follow the sciences as a full time endeavor.

The five essential disciplines of science — observation, recording, classification, experiment, and analysis — were being applied by numerous devotees of biological and physical sciences in the eighteenth and first half of the nineteenth century. During this period of vigorous activity much of the mantle of empiricism and folk-lore which surrounded all science was being discarded.

The earliest contributions to a scientific agriculture seem to have arisen from those segments of natural philosophy that were identified early as separate disciplines, i.e., botany and chemistry. Both were of ancient origins and seem always to have been closely associated with medicine and its practitioners.

Although botany may be said to have become formalized by 1753, when a standardized binomial nomenclature was established,[12] chemistry did not reach this stage of development until some thirty-five years later.[13] Chemistry was a part of the curriculum in medical schools in eighteenth-century England, Scotland, and in two of the Colonies in North America (Pennsylvania and New York).[14]

William Cullen, M.D. (1712-90) was Professor of Medicine and Chemistry at both the Universities at Glasgow and Edinburgh. Joseph Black, M.D. (1728-99) succeeded Cullen in the Chair of Chemistry at Edinburgh, 1766. In Philadelphia, Benjamin Rush held the Chair of Chemistry at the College of Philadelphia; and at King's College, James Smith, M.D. (d. 1812) gave lectures in chemistry, 1767-70, when he was succeeded by Peter Middleton (d. 1781). After the Revolution, King's College was reorganized as Columbia College, and Samuel Bard, M.D. (1741-1821) became the occupant of the first separate Chair of Chemistry, 1784-85. According to Professor Hornberger, "the presence of medical schools was another important factor [in the development of scientific professorships and ultimately, scientific schools] since they gave considerable impetus to the teaching of botany and chemistry."[15]

Botany was an essential part of the medical curriculum because plants were an important source of drugs. It was taught by physicians in medical colleges. Occasionally it was not a requirement for graduation, but in such instances the Professor of Materia Medica would include botany in his presentations. Later, in the early nineteenth century, the chairs of Materia Medica and Botany were often combined.

Two great medical practitioners, whose lives nearly spanned the eighteenth century, made botany a science. They were Carl von Linné (1707-78), who provided the descriptive basis of classification, and Albrecht von Haller (1708-77), who supplied the scientific bibliography.[16] "Linneaus was in fact a dangerous guide for weak minds, for his curious logic, among the worst to be met within the scholastic writers, was combined with the most brilliant powers of description."[17] Other men had to prove Linneaus's system.

In America, the valuable relationship of botany and agriculture was recognized quite early. The Trustees of the Georgia Colony sought to establish a Trustees Garden. They retained a competent physician-botanist, Dr. William Houston (1695?-1733), as director. Their purpose in establishing the garden was 'to incouraging and improving botany and agriculture in the Georgia Colony.'[18]

As we strive to examine the relationship of those men trained in medicine to the origins of scientific agriculture, an interesting intellectual continuity becomes apparent. If we may consider medicine the first generation science, then botany and chemistry become the second, and as our intellectual progeny increase, a third generation arises which includes scientific agriculture.

The early development of scientific agriculture in the west is associated with three revolutions: (1) the Industrial Revolution (eighteenth century), (2) the American Revolution (1776-83), and (3) the French Revolution (1789-95). These revolutions were both cause and effect of many great changes in our western civilization.

As the Industrial Revolution gained momentum with the advent of steam, the wages of industry enticed many from farm labor where they had grown their own food. Brought to crowded urban areas where work schedules and lack of land made even kitchen gardens impossible, this population created a demand for increased yields from land worked now by fewer hands. The transition in agricultural practices, from empiricism to science, that we are to examine specifically here, was in response to the Industrial Revolution, but certainly may be viewed as a revolution itself.

By mid-eighteenth century a growing spirit of independence from the Crown was becoming evident in the Colonies of North America. Evidence of this spirit was manifest in subtle ways perhaps overlooked by the government of King George. The ever-increasing population of the Colonies, swelled some by births but mainly by the flood of immigrants, was growing less dependent upon Great Britain for essential commodities.

These colonists now boasted their own colleges (Harvard, Yale, and William and Mary)[19] where they could educate able students for the clergy or the bar; and by 1767, two medical colleges had been established, one in Philadelphia (1765) and the other in New York City (1767). Academies were established in the larger cities on the coast. Even small towns had common schools and a few may have even hired with public funds a schoolmaster.

An educated or even literate populace was not commonplace in the Colonies at this time in mid-century, but the three Rs were being mastered by ever-increasing numbers.

Newspapers began to appear sporadically in the early decades of the eighteenth century. By mid-century, in the six colonies with the largest population, fourteen weekly newspapers were published.[20] By 1754, there were four weekly papers published in Boston for all New England.[21] Philadelphia boasted *The Pennsylvania Gazette* of Benjamin Franklin, *The Pennsylvania Journal and Weekly Advertiser* of William Bradford, and a German newspaper, *Die Zeitung*.[22]

Book printing thrived in the latter half of the eighteenth century. Although it appears that most of the ink and paper were expended printing the sermons and disputations of religious leaders, some scientific subjects received patronage. The reprinting of British and European books (in pirated editions) seems to have been a well-established practice prior to the Revolution.

By the fourth decade of the eighteenth century, Philadelphia was the most populous city in the North American colonies and perhaps the wealthiest one in terms of trade and commerce. Fortunately there was, in this commercial capital, a vigorous and personable printer with catholic interests in the sciences — Benjamin Franklin (1706-90). For purposes of our present discussion, Franklin established a most important society "for the promotion of useful knowledge" — The American Philosophical Society (1743).[23] This Society served as a center for the exchange of ideas and the discussion of new discoveries and inventions at home and abroad. Books purchased by its members became a second scientific library.

The first scientific library, The Library Company of Philadelphia, was established in 1731, also by Franklin. Titles in science comprised one-fifth of its holdings ten years after its founding.[24]

Prior to the founding of the American Philosophical Society, the principle forum for scientific discussions in the western world was the Royal Society of London. The publication and circulation of its *Philosophical Transactions* had served to disseminate new discoveries, many of which would contribute to the growth and maturation of the physical and biological sciences.

The Colonies at mid-century were primarily an agrarian society. The urgency of success and the chain of disappointments associated with the failure of crops had several long-range effects upon our social structure. Crop failure contributed to the movement of families to towns, where the head of the family could follow a trade less influenced by the vagaries of weather and the whims of seasons. But perhaps even more important was the stimulus that failures supplied to the freeholder *to increase his knowledge of husbandry* and thereby, hopefully, improve the yield of his crops. This, too, may have been an early manifestation of the spirit of independence.

By approximately the middle of the eighteenth century, we had the essentials of higher learning available in the more populous areas of the coastal communities and a sufficiently affluent society that afforded some men the leisure time to devote to experimentation and study.

Who were these men who were to develop a scientific agriculture? There were some who were merchants, tradesmen, and men from the three professions (law, medicine and the clergy). Those whom we shall examine most critically are the physicians.

Dr. Dorothy Lansing and others have asked me why I thought physicians were so interested in agriculture. Their interest may be a manifestation of an overall interest in science. In addition, these men perhaps had leisure time (or what is worse, unemployed time) to spend most appropriately in supplying their own table. Indeed, farming may have become an essential concomitant of medical practice in rural or even urban areas in the century 1750-1850, for the physician, if paid at all, was most often paid only annually.[25]

It is not enough to suppose that poor pay for his services was the main reason for the physician returning to the soil. His catholic interests in the sciences may have been the means by which he relieved the tedium and frustrations of his medical ministrations. The more readily apparent cause and effect

relationships in chemistry and botany with no associated risk of human life may well have been important factors in the physicians developing these more precise and predictable sciences.

Whitfield Bell gives us some direction in speaking of Dr. Shryock's being 'constantly struck with the ironies, inconsistancies and paradoxes of history — how public confidence in the medical profession waned in the 19th century just as medical science began to advance; how democratic prejudice against learned professions overturned or weakened medical licensure boards and abased standards of practice in the name of general welfare.'[26]

I believe this anti-science posture was a part of the overall anti-intellectualism[27] which epitomized Jacksonian democracy in the 1830s. Paradoxically, there is a good possibility that this anti-science/anti-physician attitude was the main factor inducing the medical graduate to search other fields, and may well have been the most important force contributing to the development of geology, mineralogy, biological chemistry, and scientific agriculture.

In the year 1748, there was published in New London, Connecticut, the first of a series of essays on agriculture. This was *An Essay upon Field-Husbandry in New England: as it is or may be ordered* by Jared Eliot, M.A. (1685-1763), one of New England's clerical-physicians who was also both a farmer and a scientist (Fig. 1).[28, 29] He introduced the planting of English red clover to restore the productivity of the land (1746), and he also tried turnips in his crop rotations. Root crops had only recently been introduced in the English-speaking world. His second essay concerned the use of lime from various sources to increase the productivity of the soil. He thought, naively, that the improvement produced by lime in some soils

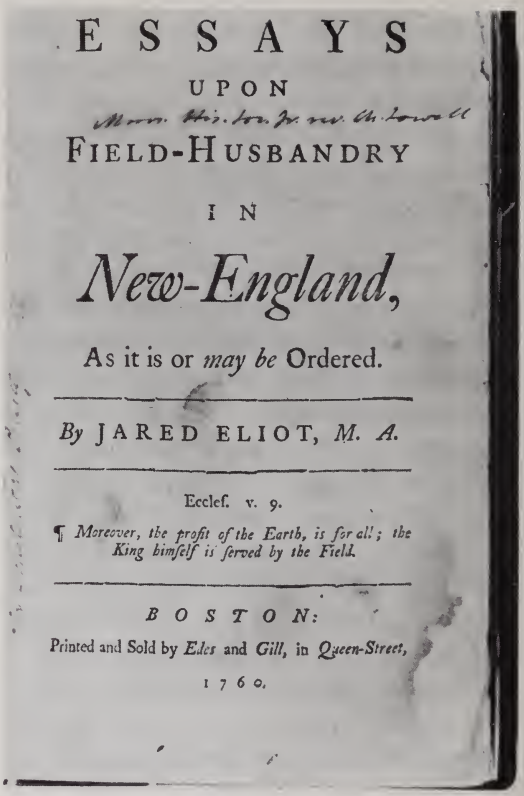

ESSAYS
UPON
FIELD-HUSBANDRY
IN
New-England,
As it is or *may be* Ordered.
By JARED ELIOT, *M. A.*
Eccles. v. 9.
¶ *Moreover, the profit of the Earth, is for all; the King himself is served by the Field.*
BOSTON:
Printed and Sold by *Eles* and *Gill*, in *Queen-Street*,
1760.

Fig. 1. Title page. Jared Eliot, *Essays* . . ., the first book on agriculture published by a native-born American practitioner. (From the collections of The Library Company of Philadelphia, Philadelphia, Pa.)

(of low pH) indicated that these calcareous manures were equal to rotted manure. He also thought wood ashes were universally a useful restorative for poor soil.

In a later essay, there is an interesting example of the interchange of ideas between England and the Colonies. The Quaker merchant Peter Collinson of London obtained, under a veil of secrecy, a letter from one Richard Jackson of Norfolk, England, which contained his first-hand description of the Norfolk System of Husbandry. This was essentially a four-field rotation planting with no fallow field. Benjamin Franklin forwarded the letter (in December 1751) to John Bartram and on to Dr. Eliot with the request that the name of the writer of the letter not be disclosed.[30]

Dr. Eliot, with President Thomas Clap (1703-67) of Yale, and a wheelwright, Benoni Hillyard of Killingworth, Connecticut, worked out a much simpler seed drill and planter than Jethro Tull (1674-1741) had assembled and described seven years before. Dr. Eliot used it to sow wheat and turnips in rows. They made another one which was sent upon request to William Logan (1718-76) of Stenton in Philadelphia.[31]

According to Professor True, 'Eliot Stands out as our first great American agricultural investigator and writer.'[32] Dr. Eliot and John Bartram (1699-1777) corresponded directly and also through their mutual correspondent, Peter Collinson (1693-1768).[33] John Bartram, although not a graduate, practiced medicine as well as horticulture, and conducted agricultural experiments on his own farm. At one time he added a catalogue of botanical remedies to a popular domestic medical guide published by Benjamin Franklin. The elder Bartram's contributions to agriculture were through his botanical studies and his extensive correspondence in the Colonies, England and France.

The severe religious conservatism of New England delayed the development of the biological sciences there, and activities seem to have shifted southward.[34] We have already noticed this in the establishing of medical schools at Philadelphia and New York, and now in the latter decades of the eighteenth century the enlightenment is further manifested in the founding of chemical and agricultural societies.

The first chemical society in the world was organized in Philadelphia in 1789 by John Pennington, M.D. (b.aet. 1769).[35] James Woodhouse, M.D. (1770-1809) was its first and only president, serving seventeen years.[36] A second society, The Columbian Chemical Society, was organized in 1811.[37] In the first volume of the *Memoirs* of this society, three of the twenty-six papers published were related to agriculture; two of these were by physicians.[38,39,40]

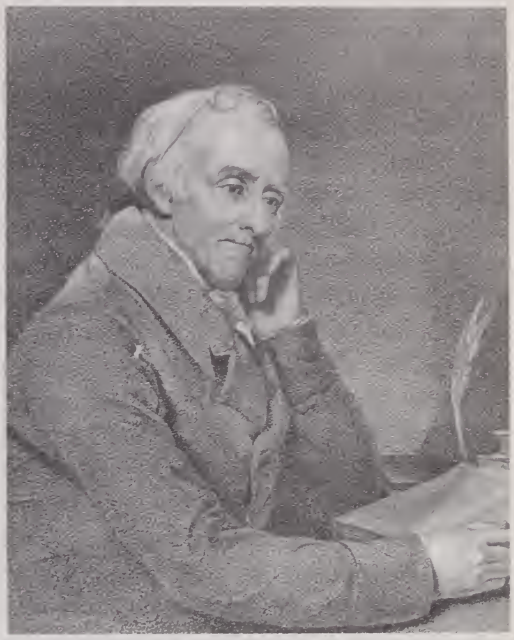


Fig. 2. Benjamin Rush, M.D. Stipple engraving by Edwin from portrait by Thomas Sully. Published by Joseph Delaplaine, Philadelphia, Pa., 1813. (Reproduced from original in *Portfolio 2,* Oct. 1813.)

Benjamin Rush, M.D. (1746-1813) (Fig. 2), the first Professor of Chemistry at the Medical School of the College of Philadelphia (now U. of Pa.) in 1769[41] had studied chemistry at the Medical School, University of Edinburgh, under Joseph Black, M.D. (1728-99). Dr. Rush gave lectures at the Medical School and he also presented public lectures in Philadelphia. Since there were no textbooks of chemistry suitable for the use of students, Rush published *A Syllabus. . .*, 1770. This was essentially the same outline that had been used by his professor at Edinburgh, but it is of particular interest in our present context, for Section 6 was entitled "Vegetable Substances, Fermentation, Agriculture."[42] Rush's public lectures of 1773/74, following a similar outline, included a lecture 'Of the elements or principles of agriculture.' Although Dr. Rush

did not adopt the chemical philosophy of Lavoisier and Fourcroy, he 'sent forth from his lecture room hundreds of pupils inspired with a glowing faith in experimental science.'[43]

One of the very early contributors to literature pertaining especially to agriculture was James Tilton, M.D. (1745-1822), a 1768 graduate from the College of Philadelphia and both a physician and agriculturalist.* He wrote notes on agriculture in Delaware, in response to the queries of Abbe' Alexandre Henri Tessier (1741-1837), French agronomist. They were published in the *American Museum* in 1789.[44] Dr. Tilton also included brief comments on agriculture in his Medical History of Delaware which he prepared for inclusion in William Currie's *An Historical Account of the Climate and Diseases of the United States,* Philadelphia, 1792.†

Agricultural societies began to appear in the United States soon after the Revolution. The Philadelphia Society for Promoting Agriculture (1785); in Charleston, The Agricultural Society of South Carolina (1778, re-instituted 1785); in Boston, The Massachusetts Society for Promoting Agriculture, seven years later; and The Society for the Promotion of Agriculture, Arts and Manufacturers (New York, ca. 1796) are but a few examples. Physicians played a major role in their founding. A national agricultural society was not established until 1803.[45] The activitites and correspondence conducted by these societies and their members was of considerable importance in the cross fertilization of ideas between men of science in the United States and agronomists, agriculturists, and chemists in the British Isles and Europe.

Since I believe that the scientific basis of agriculture received its most effective stimulus from chemistry and the lecturers and writers who popularized this science in the early nineteenth century, I shall mention here some of their contributions.

The first American book on chemistry was Dr. John Pennington's *Chemical and Economical Essays,* published in Philadelphia in 1790.[46] There were also lecture outlines which listed topics such as chemistry in agriculture, chemistry of vegetables, soils, etc. One medical school catalogue included a description of lectures on agriculture as a part of the required curriculum. Another early book on chemistry, that of Thomas Ewell, M.D. (1785-1826) of Virginia, included a final chapter which was a mixture of chemistry and physiology of plants and a discussion of mineral and animal manures.[47]

The first book published in America that could be called a textbook of chemistry was the contribution of the apothecary-chemist, James Cutbush (1788-1823). It was titled *The Philosophy of Experimental Chemistry* and appeared in Philadelphia in 1813.[48] There were many other books on chemistry written by physicians. The close association of medicine and chemistry is demonstrated in the 1796 Philadelphia edition of the *Edinburgh New Dispensatory*, which also contained 'a full and clear account of the New Chemical Doctrines published by Mr. Lavoisier.'[49]

That there was an interest developing within the medical profession for

*Tilton practiced medicine in Dover, Delaware, and served as senior hospital physician and surgeon during the revolution. He was a member and active correspondent of the Philadelphia Society for Promoting Agriculture and was well acquainted with the medical and political figures of Philadelphia.

†Tilton's account of the chief crops in the U.S. in 1788 listed corn, wheat, timothy, clover hay, limited oats, barley, rye and vegetable crops. The general rotation was corn followed by wheat followed by hay or pasture. Dr. Tilton also mentioned plant diseases such as scab, rust and smut, the Hessian fly, and weeds that were a problem.

understanding the growth of plants and their chemical content is suggested by an address to the Chemical Society of Philadelphia in 1801[50] by Felix A. Pascalis, M.D. (1750?-1833) who was co-editor of *The Medical Repository*. He included in this address much that was current thinking on the chemistry of plants.

Public lectures on chemistry were the first public lectures in the sciences and provided both entertainment and enlightenment. The lectures and lecturers have been carefully examined in another context.[51] These men are of special interest here for several reasons. First, their lectures often included a discussion of chemistry in agriculture. Second, all of these public lectures, particularly in America, were presented outside of any formal institution of higher learning,* and their content was restricted only by time and whether or not it could be made interesting and entertaining. The favorable intellectual climate in Philadelphia and New York is suggested by the following list of physician-lecturers in chemistry: Benjamin Rush (1774-75, Philadelphia); John Vaughn, M.D. (1799-1800, Wilmington, Delaware); Patrick K. Rogers, M.D. (1805-12, Philadelphia; 1812-19, Baltimore); Thomas P. Jones, M.D. (1809-10, Albany, New York; 1810-14, Philadelphia); Samuel L. Dana, M.D. (1839-40, Lowell, Massachusetts); and James Mease, M.D. (ca. 1800, Philadelphia).[52]

Popular lectures catered to the curiosity of people who were now beginning to be generally enlightened in matters other than religion. Closely associated with these public lectures in chemistry and/or natural philosophy was a need for books on the sciences addressed to the general reader.

The most important book on chemistry for lay consumption was published in the nineteenth century and appeared in London in 1806 titled *Conversations on Chemistry*. A pirate edition was immediately published in Philadelphia.[53] The author was a talented lady, Jane Haldimand Marcet (1769-1858), the wife of the physician, Alexander J. G. Marcet (1770-1822), lecturer in chemistry at Guy's Hospital, London.[54] Her name did not appear as author until forty years later. This book, which is a dialogue between the teacher, Mrs. Bryan, and two students, Emily and Caroline, was continually revised by Mrs. Marcet and included the latest discoveries in chemistry, particularly those of Sir Humphry Davy (1778-1829).

These *Conversations*. . . (Fig. 3) gave the American public exposure to Davy's work on general and agricultural chemistry and supplemented information supplied through newspapers and agricultural publications that began to appear in the 1830s.

Several physicians edited American editions of Mrs. Marcet's *Conversations on Chemistry*,* but their editorial contributions are trifling. Jane Marcet also wrote *Conversations on Vegetable Physiology; Comprehending the Elements of Botany, with their Application to Agriculture* (Fig. 4). An American edition appeared in 1830 and, as in her other *Conversations*. . . ., it contained current scientific information succinctly presented for an eager public.

Books on chemistry and vegetable physiology were of primary importance to the development of a scientific agriculture. The next step in establishing American science was the founding of medical journals which were our earliest journals of science.

*Sir Humphry Davy is perhaps an exception here since he was a demonstrator and later lecturer at the Royal Institution of London.

*Thomas Cooper, M.D., Philadelphia, 1818 edition; J.L. Comstock, M.D., Hartford, 1831 edition.

Samuel L. Mitchill, M.D. (1764-1831), of New York, with Elihu H. Smith, M.D. (1771-98) and Edward Miller, M.D. (1760-1812), established the *Medical Repository*, 1797. Dr. Mitchill was its principal editor for twenty-three years. The influence of the faculty at Edinburgh is also apparent in Dr. Mitchill, who, after his return to New York, practiced medicine, studied law and, in 1792, was appointed Professor of Natural History, Chemistry and Agriculture at Columbia College. He later assumed the chair of Botany.[55] Like Woodhouse in Philadelphia, he published a synopsis of Lavoisier's chemical nomenclature.[56]

Doctor Mitchill studied fertilizers and was a vigorous promotor of agriculture in New York state. He helped found the Society for the Promotion of Agriculture, Arts and Manufacturers. In 1807, he was appointed Professor of Chemistry at the College of Physicians and Surgeons of New York and later occupied the Chair of Natural History and in 1820, the Chair of Botany and Materia Medica. He was characterized as a chaos of knowledge 'or a walking encyclopedia' by his contemporaries, but he had a wide and favorable influence in the development of the sciences.

A second journal was established in Philadelphia in 1805 by John Redman Cox, M.D. (1773-1864),the *Philadelphia Medical Museum* (18 May 1805). It recorded general science as well as medicine. Later this same year, Benjamin Smith Barton, M.D. (1766-1815) began publication of *The Philadelphia Medical and Physical Journal,* an eclectic journal which he proposed to conduct "with a constant eye to the pursuits of the physician, the Naturalist, the Philosophical Geographer and the Agriculturalist."[57] The following year the enterprising Daniel Adams, M.D. published in Boston *The Medical and Agricultural Register.* It lasted only one volume for 1806 and 1807.[58] Other medical journals were founded, but the first general science journal was established in 1818 by Benjamin Silliman, M.D. (1779-1864) (Fig. 5). It was familiarly known as Silliman's Journal and officially as *The American Journal of Science and Arts.**

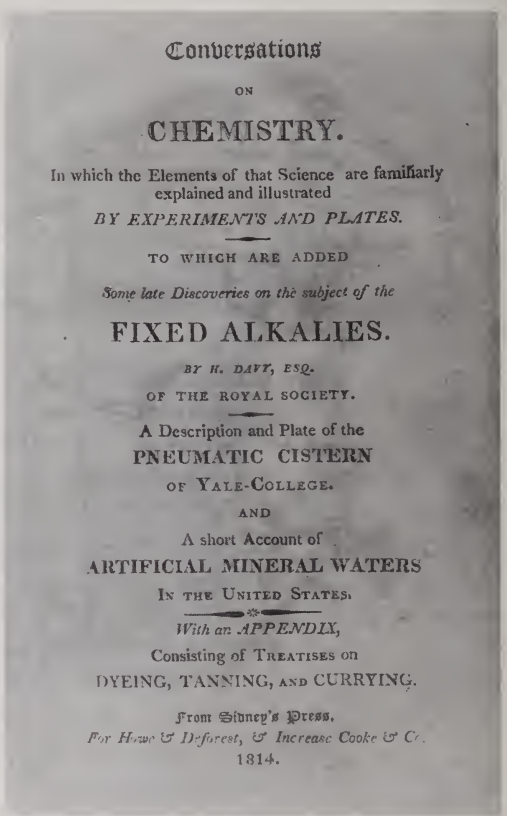
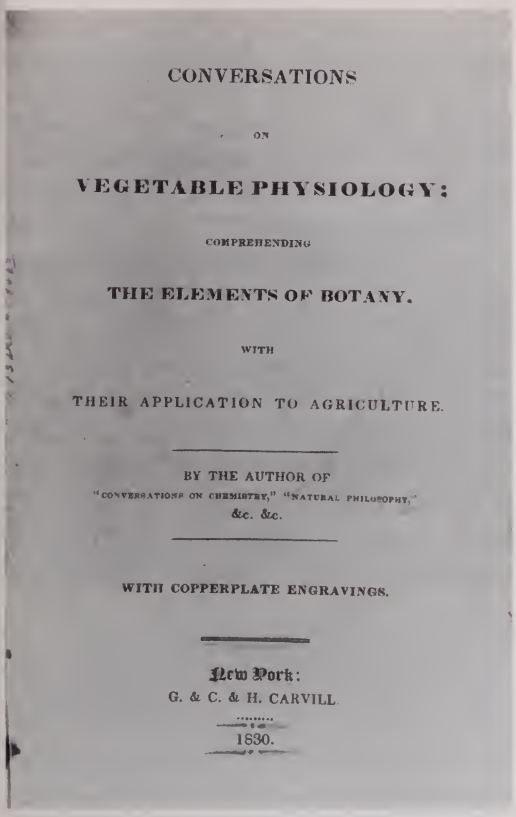

Conversations
ON
CHEMISTRY.
In which the Elements of that Science are familiarly explained and illustrated
BY EXPERIMENTS AND PLATES.
TO WHICH ARE ADDED
Some late Discoveries on the subject of the
FIXED ALKALIES.
BY H. DAVY, ESQ.
OF THE ROYAL SOCIETY.
A Description and Plate of the
PNEUMATIC CISTERN
OF YALE-COLLEGE.
AND
A short Account of
ARTIFICIAL MINERAL WATERS
IN THE UNITED STATES.
With an APPENDIX,
Consisting of TREATISES on
DYEING, TANNING, AND CURRYING.
From Sidney's Press.
For Howe & Deforest, & Increase Cooke & Co.
1814.

Fig. 3. Title page to an early American edition. Jane Marcet, *Conversations on Chemistry* [New Haven, Conn.], 1814. (From the author's collection.)

A medical education and an opportunity for the full-time pursuit of agriculture was the fortune of George Logan, M.D. (1753-1821) (Fig. 6), grandson of James Logan of Philadelphia. Dr. Logan was a graduate of

*Benjamin Silliman, M.D. edited the journal for twenty-seven years (1818-45), when he relinquished the editorship to his son.



CONVERSATIONS

ON

VEGETABLE PHYSIOLOGY:

COMPREHENDING

THE ELEMENTS OF BOTANY.

WITH

THEIR APPLICATION TO AGRICULTURE.

BY THE AUTHOR OF
"CONVERSATIONS ON CHEMISTRY," "NATURAL PHILOSOPHY,"
&c. &c.

WITH COPPERPLATE ENGRAVINGS.

New York:
G. & C. & H. CARVILL
1830.

Fig. 4. Title page to the first American edition. Jane Marcet, *Conversations on Vegetable Physiology . . .*, New York, 1830. (From the author's collection.)

Edinburgh (1779), but upon his return to Philadelphia, he devoted all his scientific attention to agriculture. He was a personal friend of Thomas Jefferson, and their mutual interest in agriculture provided Jefferson relaxation and enlightenment while he resided in Philadelphia. Dr. Logan published the results of his *Agricultural Experiments to Ascertain the best Rotation of Crops. . .*[59, 60] and *Agricultural Experiments on Gypsum or Plaster of Paris* in Philadelphia in 1797.[61] Later he published *A Letter to the Citizens of Pennsylvania, on the Necessity of Promoting Agriculture, Manufactures, and the Useful Arts.* The second edition also contains the constitution of the Lancaster County Society for Promoting Agriculture. . . which may indicate that the ardent Federalists in predominence in the Philadelphia Society. . . had forced Dr. Logan, who was not of their political persuation, to participate in agricultural society activities elsewhere.[62, 63]

Agricultural Society activities gave a forum for the discussion of new ideas and discoveries as pertained to the wide vistas of a new science not yet clearly defined. These vistas included hybridization of grains and other plants, the grafting of trees and vines, orchard and vine culture, new crops, discussions of weeds and their control, insect pests, fungus and mycotic diseases of plants, and soils and manures. Discussions of soils and manures were subjects to which physician-chemists were the main contributors.

Sir Humphry Davy (1778-1829) had been apprenticed to a surgeon in Penzance. He was mostly self-trained in chemistry under the guidance of Thomas Beddoes, M.D. (1760-1808), sometime reader in chemistry at

Fig. 5. Benjamin Silliman, M.D., from an engraving, the frontispiece. G.P. Fisher, *Life of Benjamin Silliman . . .* Vol. I. New York: C. Scribner & Co., 1866.

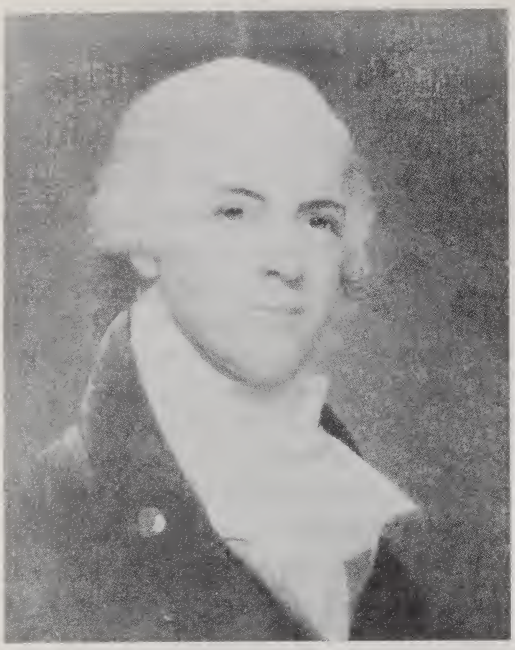


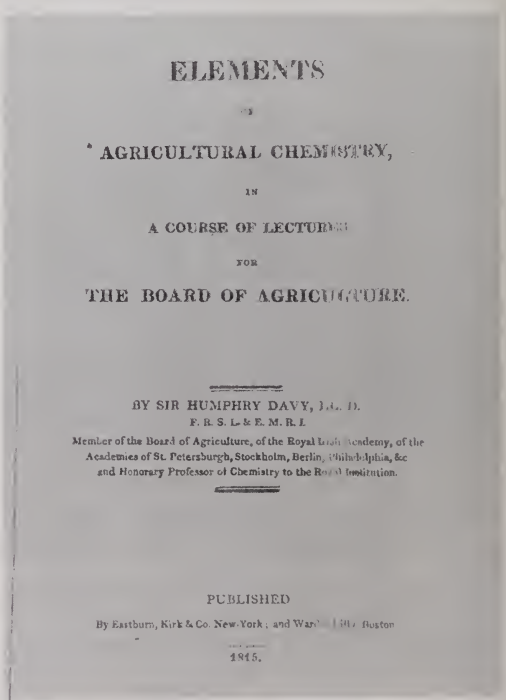
Fig. 6. George Logan, M.D., by Gilbert Stuart. (Original in the collections of The Historical Society of Pennsylvania, Philadelphia.)

Oxford. In 1813, he published *Elements of Agricultural Chemistry* (Fig. 7). This book, a collection of annual lectures to the British Board of Agriculture, was the result of ten years of work in the laboratory and at his experimental farm at Roehampton.[64]

The first American reputed to have read Davy's book was Judge Richard Peters (1744-1828) of Philadelphia, and he promptly drew it to the attention of the members of the Philadelphia Society for Promoting Agriculture.[65] This book was probably the most popular book ever written on the subject, according to Wyndham Miles, and it went through six editions in England. American editions appeared two years later in both New York and Philadelphia, followed later by four others. It was translated into French (1819, 1820 and 1828), Italian (1815), and German (1814).[66]

Davy was a remarkable scientist. He worked as an experimental agriculturalist during the same period that he was doing experimental work in inorganic chemistry and electro-chemistry. In fact, he was writing another book, *Elements of Chemical Philosophy* (1812), at the same time he was writing the now famous *Elements of Agricultural Chemistry.*

Davy's work was practical and included chapters on the organization of plants, on soils and methods of improving their fertility, manures of vegetable and mineral origin, crop rotation and nutrient values of forage, etc.[67] Quotations from or comments on Davy's work appeared throughout the western world in newpapers, agricultural journals, and general magazines from 1811 to 1835. After this time his influence began to diminish.



ELEMENTS

OF

AGRICULTURAL CHEMISTRY,

IN

A COURSE OF LECTURES

FOR

THE BOARD OF AGRICULTURE.

BY SIR HUMPHRY DAVY, LL. D.
F. R. S. L. & E. M. R. I.
Member of the Board of Agriculture, of the Royal Irish Academy, of the Academies of St. Petersburgh, Stockholm, Berlin, Philadelphia, &c and Honorary Professor of Chemistry to the Royal Institution.

PUBLISHED
By Eastburn, Kirk & Co. New-York; and Wa[illegible] Boston
1815.

Fig. 7. Title page to the first American edition. Sir Humphry Davy, *Elements of Agricultural Chemistry,* New York and Boston, 1815. (From the author's collection.)

Before further considering the physicians' contributions to the development of a

scientific agriculture, one may pause to ask if any public-spirited physician directly challenged the prevailing agricultural practices in our relatively young country which by the early decades of the nineteenth century was spreading her peoples onto vast new lands in the trans-mountain west. At least one did. He was Daniel Drake, M.D. (1785-1852), an indefatigable teacher of medicine and science and one of the most public-spirited individuals in the Ohio Valley. In 1815, he published . . . *Picture of Cincinnati*, a description of the geology, weather, general topography, and the cultural advantages of the community. In it he offered a critique of agricultural practices and raised one of the earliest voices for preserving our forests.

> The agriculture of this, as of other new countries is not of the best kind. Too much reliance is placed on the extent and fertility of their fields, by the farmers, who in general consider these a substitute for good tillage. They frequently plant double the quantity they can properly cultivate, and thus impoverish their lands, and suffer then to become infested with briars and noxious weeds. The preservation of the forests of a country should be an object of attention in every stage of its settlement; and it would be a good policy to clear and plant no more land in a new country, than can be well cultivated.[68]

As early as 1818, Governor DeWitt Clinton of New York recognized the importance of geology to agriculture, for he requested Amos Eaton (1776-1842) to lecture to the New York legislators on geology and its application to agriculture.[69] Through physician-geologists and physician-chemists on geological surveys scientific agriculture was advanced, since each of the survey reports usually had a section on the composition of soils.

Charles T. Jackson, M.D. (1805-80), Professor of Chemistry at Harvard Medical School, made geological surveys of Maine, Rhode Island, and New Hampshire. In his first report of the geological survey of the latter state, he observes, "Agriculture also profits from geological surveys, by the analytical researches which are made to determine the nature and composition of soils,. . . ."[70] Dr. Jackson was among the first men in America to engage in agricultural chemistry.[71]

David Dale Owen, M.D. (1807-60) of New Harmony, Indiana, although a graduate of the Medical College of Ohio, never practiced. Instead he conducted geological surveys of Indiana, Wisconsin, Iowa, and Kentucky. He later became the first U.S. geologist (1848).

His chemist on the Kentucky Geological Survey (1856) was Robert Peter, M.D. (1805-94). Dr. Peter practiced medicine briefly in Lexington but devoted his life to chemistry and the natural sciences. He held the Chair of Chemistry in two medical schools, was an expert analytical chemist, and made a comfortable living performing soil analysis. Such services were advertised in agricultural journals. "Soil analysts who appeared in the *Cultivator* and *American Agriculturalist* between 1844 & 1854 included" these physicians: "Chas. T. Jackson, Robert Peter and Benjamin Silliman."[72]

Gerald Troost, M.D. (1776-1850), chemist, mineralogist, and geologist, was one of the founders and first president of the Academy of Natural Sciences of Philadelphia (1812).[73] He was on the staff of Peale's Museum in Philadelphia (1821) as a mineralogist and conducted a geological survey of the environs of Philadelphia for the Philadelphia Society for Promoting Agriculture, which he published in 1826. From 1828 until his death he influenced undergraduate and medical students at the University of Nashville, where he taught geology, mineralogy, chemistry, and natural history. He was also state geologist of Tennessee.

John Lawrence Smith, M.D. (1818-83), a native of Charleston, South Carolina, was educated first as an engineer and later as a physician at the Medical College of South Carolina. He studied chemistry under Orfila, Dumas, and Liebig while in Europe. He

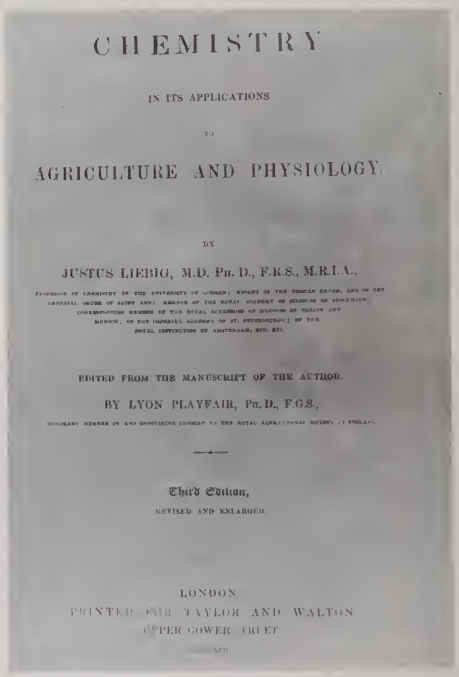
returned to Charleston in 1844, where he practiced medicine and founded the *Charleston Medical and Surgical Journal.* He soon relinquished medical practice to become an assayer of bullion and devoted much time to agricultural chemistry. The beds of marl around Charleston received his scrutiny, and he pointed out their calcium phosphate content and their importance to agriculture as a calcareous manure. He became an expert on the character of soils and methods of culture which affected the growth of cotton. He briefly taught chemistry at the University of Louisville Medical Department.[74]

Beginning about 1830, there is a detectable transition from naturalist to scientist,[75] and the focus of education in the sciences began shifting from the medical schools and the medically educated science professor to separate schools of science staffed by professors educated in the sciences but not in medicine.

Chemistry and biological sciences of increasing complexity and specialization required separate schools and laboratories for teaching. The first separate school of science was Gardiner Lyceum in Gardiner, Maine, which opened in 1823 for the purpose of giving instruction in the chemistry of agriculture and arts.[76] The next one established was Rensselaer Institute in Troy, New York (1824).

From these first schools, for essentially undergraduate teaching, evolved a laboratory at Yale which eventually became the Sheffield Scientific School in 1846-47, but was not supported by the corporation. At this same time (1847) Louis Agassiz, M.D., Ph.D. (1807-73) became the first professor at the newly established Lawrence Scientific School at Cambridge.[77]

Justus von Liebig, M.D. (1803-73), founder of the laboratory teaching of chemistry at Giessen in 1826, established the leading journal of chemistry, [Liebig's] *Annalen der Chemie* (1832-74), and was the founder of agricultural chemistry.[78] Liebig was a skillful chemist and seemed always able to select the areas of study which led to simple results and simple explanations. In 1840, he published his *Organic Chemistry in its Application to Agriculture and Physiology* (Fig. 8) and


CHEMISTRY

IN ITS APPLICATIONS

TO

AGRICULTURE AND PHYSIOLOGY.

BY

JUSTUS LIEBIG, M.D. PH. D., F.R.S., M.R.I.A.,

EDITED FROM THE MANUSCRIPT OF THE AUTHOR.

BY LYON PLAYFAIR, PH.D., F.G.S.,

Third Edition,

REVISED AND ENLARGED.

LONDON:

Fig. 8. Title page. Justus von Liebig, M.D., *Chemistry in its Application to Agriculture and Physiology*. Third edition. London, 1843.

fifteen years later (1855) *Principles of Agricultural Chemistry* . . . . He addressed agricultural societies in Europe and England on manures and soil analyses. There was great interest in soil analysis and fertilizers in America and Europe from about 1846 until 1852, and much of Liebig's work was quoted and praised in American agricultural journals.

Interest in soil analysis came to an abrupt end when David A. Wells (1828-98) of the Lawrence Scientific School showed comparable analysis of mineral content of fertile as well as barren soils.[79] Robert Hare,

M.D. (1781-1858), Professor of Chemistry at the University of Pennsylvania Medical Department, was apparently a leavening influence in that he opposed the all-out campaigns for soil analysis and the attempt to equate lack of fertility to specific mineral deficiencies.

As the soil analysis craze was beginning, a Yankee physician-geologist-chemist, Samuel L. Dana, M.D. (1795-1868), after a brief period of medical practice, turned to industrial chemistry. While employed in a calico printing plant, he studied mordants for various dyes. In evaluating the composition of natural mordants (cow-dung), he perfected an analytical method for detecting the quantity of phosphates present — a discovery also useful in agriculture.[80] (The lack of such a precise method had confused both Davy and Liebig.) Dana published, in 1842, an interesting and useful booklet entitled *A Muck Manual for Farmers,* which went through four editions.

One last physician-chemist must be mentioned here. He is John William Draper, M.D. (1811-82), an 1836 graduate of the University of Pennsylvania. After practicing a short while, he became Professor of Chemistry at the College of William and Mary and at Hampden-Sidney College. In 1841, he helped found the New York University Medical College and became Professor of Chemistry there.[81] In New York, he did much pioneer work on photochemistry and the growth of plants. By 1844, he summarized his studies in *A Treatise on the Forces which Produce the Organization of Plants.*[82] He came very close to developing the concept of photosynthesis. His studies of light included a full range of physical and physiologic effects. He devoted considerable attention to improving the photographic process begun by Daguerre.[83]

Many physicians contributed to the development of scientific agriculture through sciences other than chemistry. Entomology was late in receiving the attention of the medical profession. One insect pest that was new in the Philadelphia area during the years of the Revolution and spread widely thereafter was the so-called Hessian fly (*Phytophaga destructor*), which was supposedly brought to this country by the Hessian mercenaries. It was a black fly or midge that was extremely destructive to wheat, barley, and rye. Dr. James Tilton, a member of the Philadelphia Society for the Promotion of Agriculture, wrote about this insect and its destructiveness perhaps as early as 1788.[84] There were two men from Harvard who contributed to the descriptive aspects of the devastation of vegetation by various insects. William Dandridge Peck, M.D. (1763-1822), Professor of Natural History at Harvard, wrote on the slug worm and the canker worm (1795).[85] Thaddeus W. Harris, M.D. (1795-1856), Librarian at Harvard, in 1841 wrote a book entitled *Insects Injurious to Vegetation in Massachusetts.*[86] Entomology was still in its infancy even by mid-century, and commentary on insect pests seldom mentioned control measures, for poisoning was not introduced until 1885.[87]

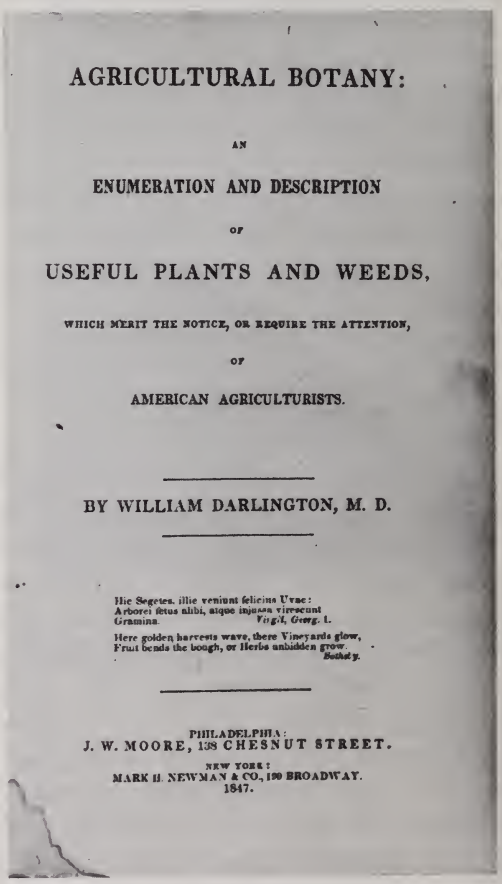
Horticulture was a part-time and frequently full-time employment of many physicians. We can but mention a few. David Hosack, M.D. (1769-1835), Professor of Botany and Materia Medica at Columbia and founder of the Elgin Botanical Garden at Hyde Park, New York, contributed a paper to the Horticultural Society of London which introduced the Seckel Pear, a product of Pennsylvania. "The original venerable Seckel pear tree stands in a meadow in Passyank Township, less that a quarter of a mile from the Delaware River, opposite to League Island, not more than half a mile from the mouth of the Schuylkill, and about 3 1/2 miles from the city of Philadelphia. It measures 6 feet in circumference and is about

30 feet high. . . it is now in a great state of decay."[88, 89] The venerable James Thacker, M.D. (1754-1844) wrote *The American Orchardist*, Boston (1822), in which he discussed the cultivation of apples, pears, plums, and grapes. He also wrote a *Practical Treatise on the Management of Bees* (1829).[90]

No consideration of the role of physicians in the development of a scientific agriculture should be concluded without mention of William Darlington, M.D. (1782-1863), of Chester County, Pennsylvania (Fig. 9). This University of Pennsylvania graduate (1804) practiced in West Chester but botanized in all parts of his native county. His greatest direct contribution, as a practical agriculturalist and professional botanist, was his book, *Agricultural Botany* (Fig. 10), which appeared in two editions (1847, 1853).[91,92] It is of interest here to observe that Humphry Marshall (1722-1801) (whom Dr. Darlington memorialized), in an address to the Philadelphia Society for Promoting Agriculture, in February 1786, had made the observation that agriculture claimed the strictest relation to botany, although the science of botany held its most dignified station when subservient to medicine.[93]

Scientific agriculture and the adoption of its principles could not be fully achieved in the U.S. (before 1850) so long as there was always more new farm land available in the West.

Fig. 9. Portrait of William Darlington, M.D., reproduced from H.A. Kelly, *Some American Medical Botanists . . .*, Troy, N.Y., 1914.


AGRICULTURAL BOTANY:

AN

ENUMERATION AND DESCRIPTION

OF

USEFUL PLANTS AND WEEDS,

WHICH MERIT THE NOTICE, OR REQUIRE THE ATTENTION,

OF

AMERICAN AGRICULTURISTS.

BY WILLIAM DARLINGTON, M. D.

Hic Segetes, illic veniunt felicius Uvae:
Arborei fetus alibi, atque injussa virescunt
Gramina. *Virg. Georg. I.*

Here golden harvests wave, there Vineyards glow,
Fruit bends the bough, or Herbs unbidden grow.
Bothaby.

PHILADELPHIA:
J. W. MOORE, 138 CHESNUT STREET.
NEW YORK:
MARK H. NEWMAN & CO., 199 BROADWAY.
1847.

Fig. 10. Title page. William Darlington, M.D., *Agricultural Botany . . .*, Philadelphia and New York, 1847. (From the original in the collections of The Library Company of Philadelphia, Philadelphia, Pa.)

Fortunately, before all the land was taken up, the United States Agricultural Society, flourishing between 1852 to 1860, had been active in agitating for national support of

agricultural colleges. Finally, the bill presented by Rep. Justin S. Morrill (1810-98) of Vermont, first on 14 December 1857 (but vetoed by President Buchanan) was reintroduced, passed, and signed by President Lincoln, 2 July 1862. This was known as The Morrill Act or the Land Grant College Act. It set aside 30,000 acres of government land per member of Congress to support the establishment of "land grant colleges" in every state and territory.[94, 95] By this same active and apparently understanding Congress, the U.S. Department of Agriculture was created as a separate department in May 1863.[96, 97]

The father of American agricultural education was Norton Strange Townshend, M.D. (1815-95). A native of England, he was reared on a farm in northern Ohio (Lorain County). After teaching school briefly, he graduated from the College of Physicians and Surgeons in New York in 1840. A year's sojourn in England and Europe was followed by his establishing a medical practice in Elyria, Ohio.[98] In 1854, he and three other teachers, including John Strong Newberry, M.D. (1822-92), established The Ohio Agricultural College at Oberlin, Ohio.[99] This venture lasted but three years.

When the Iowa Agricultural College opened in March 1869, it became the first school to accept the provisions of the Morrill Act. Dr. Townshend was appointed Professor of Agriculture and Horticulture. The next year Ohio accepted the provisions of the Act, and a Board of Trustees of the Ohio Agricultural and Mechanical College was appointed. Dr. Townshend was one of the members. In September 1873, when the Ohio Agricultural and Mechanical College was opened, Dr. Townshend was appointed Professor of Agriculture, which course also included the subjects of Botany and Veterinary Medicine. He practiced medicine as physician to the students and served with distinction as Professor of Agriculture until 1891.

By 1863, agriculture had achieved the status of a separate science and was being further subdivided. It had its own schools, societies, texts, and journals, and was represented by a separate department of the federal government. Physicians had played a major role in this achievement as the husbandmen of chemistry and botany and had supplied trained men to the new science.

All of these events took place in a society imbued with a spirit of independence of thought and action. The anti-intellectualism and imperious self-sufficiency of Americans, coupled with an over-abundance of medical graduates, were the combined social forces which launched scientific agriculture.

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4. Jethro Tull (1674-1741), educated at St. John's College, Oxford, introduced new farming methods and devised a seed drill and a cultivator drawn by horses, known first as a horse-hoe. He published *The New Horse Houghing Husbandry; or An Essay on the Principles of Tillage and Vegetation,* 1731, 1733, and supplement 1740.
5. Bay J. Christian, introduction. 1953. In: *God Speede the Plough (1601).* Cedar Rapids, Iowa: Facsimile reprint privately printed for the Friends of the Torch, pp. 9-30.
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7. Tusser, T. 1557. *A Hundred Good Points of Husbandrie.* London.
8. Platt, H. 1594. *The Jewell House of Art and Nature. . .*
9. *God Speede the Plough,* p. 22.
10. The first Ph.D. degree in any science was awarded at Yale in 1861. See J.F. Fulton, "Science in American universities 1636-1946 with particular reference to Harvard and Yale." *Bull. Hist. Med.* 20:97-111, 1946.

11. Natural philosophy and astronomy were a combined chair at Columbia Medical College, 1785-86, when Samuel Bard, M.D. was the Professor. Dr. Bard was well aware that some men would be interested in chemistry but would not wish to study medicine. In advertising his course of public lectures in chemistry (1774), he announced such an observation. See B. Stookey, "Samuel Bard's Course on Natural Philosophy and Astronomy, 1785-86: Required for a Medical Degree at Columbia." *J. Med. Educ.* 39:397-406, 1964.

12. Carlo Linneaus published his *Systema Naturae* in 1735, a classification of plants based upon the sexual system. The binomial nomenclature was presented in 1753 and required approximately twenty-five years for its adoption. See William T. Stearn, appendix. In: *The Compleat Naturalist. A Life of Linneaus*, by Wilfrid Blunt (New York: Viking Press, 1971), pp. 243, 247.

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17. von Sachs, J. 1906. *History of Botany (1530-1860).* H.E.F. Garney and I.B. Balfour, translators,second impression. Oxford: Clarendon Press, p. 89.

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19. Harvard was founded in 1636. Professor of Natural Philosophy and Math was appointed 1727. Astronomy was the first science taught there. Yale was founded 1701, with the first Professor of Natural Philosophy in 1770. William and Mary was chartered 1693, but not college level until 1710 — Professor of Natural Philosophy and Mathematics, 1711. See note 15 above.

20. Tebbel, J. 1969. *The Compact History of the American Newspaper.* New York: Hawthorn Books, Inc., p. 34.

21. The first Anglo-American newspaper was published in April 1704 in Boston; the second, on 21 December 1719 in Boston; and the third, on 22 December 1719 in Philadelphia. First in New York in 1725. By 1754 there were four published in Boston. See Isaiah Thomas. In: *History of Printing in America with a Biography of Printers and an Account of Newspapers.* Edited by M.A. McCorison from the second edition (Barre, Mass.: Imprint Soc., 1970), pp. 13, 14.

22. Ibid., pp. 431-442.

23. Benjamin Franklin organized ten friends into "a club of mutual improvement" in 1727. This was known as Franklin's 'Junto'. In 1743 he organized the American Philosophical Society modeled on the Royal Society of London. It was to be an association of scientists in the Colonies, with its administrative center at Philadelphia. See. L.T. Ambler, *Benjamin Franklin. A Perspective.* Catalogue of an exhibition held at the Fogg Art Museum, Harvard University, Cambridge, Mass., 17 April through 22 April, 1975.

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25. The physician in the late eighteenth and early nineteenth centuries, particularly in rural areas, was often paid in produce. In times when specie was particularly scarce he might only be paid annually. See M.E. Pickard and R.C. Buley, *The Midwest Pioneer. His Ills, Cures and Doctors* (New York: H. Schuman, 1946), pp. 100-101. Also W.J. Bell, Jr., "A Portrait of the Colonial Physician." *Bull. Hist. Med.* 44:497-517, 1920.

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30. True, R.H. 1928. Jared Eliot, minister, physician and farmer. *Agr. Hist.* 2:185-212.

31. William Logan to Jared Eliot dated "Stenton, near Philadelphia '7 mth 25, 1754'," in the Eliot Collection at Yale University. In this letter Logan requests Eliot to have a drill made and sent to him in Philadelphia.

32. See note 30 above.

33. There are three letters to Jared Eliot from John Bartram reproduced in William Darlington, *Memorials of John Bartram and Humphry Marshall with Notices of their Botanical Contemporaries* (Lindsay & Balkiston, 1849), pp. 372-74.

34. McKeehan, *Yale Science,* p. v.

35. John Pennington, M.D. studied medicine and chemistry under Benjamin Rush, M.D., then went to Edinburgh to complete his studies, but did not take a degree. In addition to founding the Chemical Society, he published one of the earliest American chemistry books: *Chemical and Economical Essays* (Philadelphia, 1790). See W. Miles, "Benjamin Rush, Chemist." *Chymia* 4:37-77, 1953.

36. Professor E.F. Smith states that the Chemical Society was founded in 1792 by Dr. Woodhouse. See E.F. Smith, *Chemistry in America. . .* (New York and London: D. Appleton & Co., 1914), p. 12.

37. Founded in Philadelphia, 1811, by James Cutbush, Professor of Natural Philosophy, Chemistry, and Mineralogy at St. John's College, President. Ibid., pp. 208, 215.

38. Manners, John, M.D. 1813. "Experiments and observations on the effects of light on vegetables and upon the physiology of leaves." In: *Memoirs of the Columbian Chemical Society.* Vol. 1. Philadelphia: Isaac Pierce, pp. 47-57.

39. Sutherland, Joel B., M.D. 1813. "Speculations on lime." In: *Memoirs of the Columbian Chemical Society,* pp. 58-62.

40. Lehman, George F. 1813. "On the emission of oxygen gas by plants." In: *Memoirs of the Columbian Chemical Society,* pp. 121-124.

41. Dr. Rush was the first Professor Chemistry at the medical school, but chemistry had been taught by lecture to the medical students there as early as 1765 by John Morgan, M.D. See J. S. Hepburn, "Smith and Morgan, Our First Chemists." *Gen. Mag. Hist. Chron.* 35:491-510, 1932-33.

42. First a pamphlet, *Syllabus of a Course of Lectures on Chemistry* (Philadelphia, 1770). This was followed by *A Syllabus of a Course of Lectures on Chemistry, for the use of the Students of Medicine in the College of Philadelphia* (Philadelphia: Printed for and sold by R. Aitken, Bookseller). Another edition was published 1783. See note 33 above. There are copies in The Library Company of Philadelphia and The American Philosophical Society, Philadelphia.

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A Discussion of Dr. Eugene H. Conner's paper, "Physicians and the Development of Scientific Agriculture, Empiricism and Science 1731-1863"*

By JUDITH TAYLOR, M.D.†

Mrs. Shryock, Dr. Parish, Dr. Conner, Members of the Section on Medical History of the College of Physicians: I consider it a true honor to have been invited to discuss Dr. Conner's excellent paper. It is a remarkable demonstration of trust, as Dr. Lansing had never previously met me. She accepted me at Dr. Jarcho's recommendation, and he had never met me either!

Dr. Conner has devoted himself to a probing study of the change from empiricism to science in agriculture. It has been a revelation that physicians played such an important role in this change. We are all in debt to his illuminating observations. Any comments I can make will only be tangential to his studies.

I will begin with an ancient system of agriculture which had a fairly scientific basis. The Egyptians developed very efficient systems of watering for their fields and gardens. A large central tank, which was the prominent feature of Egyptian gardens, served not only as an ornamental structure, but provided the moisture essential for plant growth. They also planted in rows, again a more efficient way of using water and keeping down weeds.

Controlling water remains a critical feature of modern agriculture today. Two recent issues of *Scientific American,* for example, described improved irrigation methods. Such economy in utilizing water becomes increasingly important as more and more fine arable land is squandered to build shopping centers and housing developments. It takes many millenia for soil to become rich and fertile, suitable for many crops. The farming regions of Long Island furnish such an example. A few years of "human development" destroys its fertility very effectively.

G.E. Fussell is an English historian of agriculture. In his *Farms, Farmers and Society,*‡ he describes some earlier attempts to introduce a scientific or "measuring/experimental" attitude toward farming. During the Late Middle Ages, the farmers in the low countries developed several improvements in technique, though still depending on imports of grain from countries further to the east. Gradually the English recognized Dutch superiority and adopted their methods. The appearance of printing played an important role in the dissemination of such new information.

The much maligned enclosure of lands and great increase in sheep flocks indirectly led to overall improvement. So did the terrible loss of manpower from successive epidemics of bubonic plague hasten the search for more efficient ways of running a farm. By the seventeenth century, it was an accepted practice to refer to books for instruction in the ancient and empirical task of farming. This implies perhaps a greater degree of literacy than might otherwise appear.

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Fussell describes two farmers who took the trouble to record the yields from their farms, and whose records have survived to the present day. One was a Dutchman, Reinek Hemmemma of Friesland, who lived in the late sixteenth century. The other was Robert Loder of Oxford, who lived in the early part of the seventeenth century. They were both concerned with improving the yield from their seeds by better manuring and nutrition of the soil.

Fussell calculated that between 1300 and 1500, a seed: yield ratio for wheat averaged about 1:4. Other students have come to the same conclusion. Rye was about the same. Barley fluctuated widely, but ranged from 1:4 to 1:8.

Hemmemma kept sixteen cows, four horses, and a few other young animals on his farm. In addition, he bought manure from a nearby town. This had the extra advantage of slightly improving the town's sanitation. He recorded fourteen bushels of wheat per acre, at a time when the average was eight to ten bushels. Loder did similar work forty years later, obtaining similar results. In some unusually good seasons he obtained thirty-two bushels per acre for wheat. He also stabilized his barley yield.

This was scientific farming. It required energy and initiative to compare results from different methods and to write them down. Farm houses were dark and primitive and the work back breaking.

Where does medicine come into this today? The precious gains in agricultural yield allowed an ever increasing population to eat better. You are familiar with the Malthusian doctrine, that human beings increase in geometric ratio but the food supply only arithmetically. By the end of the eighteenth century, the population expansion was almost exponential. McKeown has spent twenty years studying the reasons for such a vast change. Some starry-eyed physicians believed that it was because of improvements in medical care. McKeown, an epidemiologist, studied the available vital statistics and concluded that the death rates were beginning to fall for major infectious diseases long before there was any notion of their aetiology or treatment. Only smallpox seemed to be changed by the medical manipulation of vaccination, but smallpox accounted for only a small percentage of deaths.

Of all the serious adult diseases which began to have a reduced mortality, he considered pulmonary tuberculosis to be the most important numerically. In his opinion, improved nutrition because of improved and more scientific agricultural practices gave people strength to combat the tubercle bacillus long before the medical profession could lift a finger. Similarly, the ability to keep milk cattle through the winter played a major role in improving nutrition, even though the milk may have been dirty and often infected. A clean water supply added benefits, as did some early attempts at sanitation.

If we are truly to be good doctors, it behooves us to be aware of food and its production, as it is central to health. Voltaire said "We are what we eat." If the millions of malnourished poor people in Asia, Africa, and South America had enough to eat, "tropical diseases" would hardly exist.

A Tale of Two Colonial Cities: Inoculation Against Smallpox in Philadelphia and in Boston

By ROSLYN STONE WOLMAN, Ph.D.*

Of all the possible hazards to life in the eighteenth-century American colonies, unpredictable waves of lethal smallpox were the most consistent. Boston experienced six major epidemics and Philadelphia ten before the end of the colonial period. Outbreaks of contagion did not appear simultaneously in the two areas except in 1702 and in 1730-31, even though the disease was extremely communicable. These cities, in this respect, were protected at least partly by hindrances to travel and by the peculiar parochial prejudices which tended to reduce free association between them, at least in the early part of the century. Most of the epidemics were thought to have been started by ships from infected areas such as the West Indies, London, and Ireland[1] carrying sick passengers or contaminated cargo.

The Boston Selectmen, by 1702, had settled on a policy of isolation and quarantine for the control of the disease. Ships from infected regions were detained in the harbor until an inspection could clear them. If smallpox patients were aboard, the sick passengers were sequestered in a separate house, where they were guarded by two watchmen bearing a bright red flag.[2]

In 1717, as Bostonians pursued trade more vigorously, and as more ships sailed into the port, the selectmen set up a small quarantine hospital on Spectacle Island in the harbor, where infected individuals from the entering vessels could be segregated. The ship captains were fined heavily if they evaded inspection, though they did not always conform lest their business be delayed.

Philadelphia's first major recorded epidemic arose in 1716, although there must have been a notable outbreak in 1712, because there was a recorded epidemic in 1731 which makes mention of a nineteen-year interval, thereby attesting to an earlier outburst (see notes). There is no way of estimating the severity of the 1716 epidemic, because of the fact that newspapers were not yet published in Philadelphia and no tables of mortality have come down to us. The disease may have been brought in by a ship, but Pennsylvania's quarantine law of 1700, passed after a severe outbreak of yellow fever, specified that suitable provision be made for the "Reception of Sickly Passengers" [3] and no such action was taken that year.

A full-scale epidemic occurred in Boston in 1721. Since the city had not been exposed for nineteen years, a whole generation had matured without being immunized through exposure. Not surprisingly, the number of infected persons (5,759 out of a population of 11,000 with about 842 deaths or 1 in 6) [4] was appalling. Cotton Mather and Dr. Zabdiel Boylston encouraged inoculation. This process consisted of injecting into the veins of susceptible persons a few drops of purulent matter from the skin lesion of a smallpox patient. The same method was then being tried in London. William Douglass, the only university-trained physician in Massachusetts, backed by most physicians and many influential townsmen, opposed the procedure because its efficacy had not been properly established. They feared that the infection

*Deceased.

would be spread and argued that "variolation," as it was called, interrupted the course of nature.[5] Boylston, nevertheless, managed to inoculate 286 persons, of whom 6 died.[6]

Despite these courageous exploratory efforts, the Boston selectmen, supported by the townsmen, forbade further operations of this kind. They continued their former policy of isolation and quarantine, and, in 1728, ordered the facilities on Spectacle Island enlarged.

In 1730 the disease flared up again in Boston and the selectmen, following their customary course, installed an isolation center on Boston Common. Once more the smouldering conflict between Douglass and his followers on the one hand and Mather and Boylston on the other, erupted. Of some 3600 patients, nearly 500 died. Of the 400 persons who were inoculated, only 12 died.[7] Nevertheless, local authorities ignored this striking difference.

An act was passed in Massachusetts Provincial Legislature requiring the head of any household containing an infected person to notify the local selectman or face a penalty of £50. The householder was to display a red flag of warning until the selectmen deemed the place free of contagion.[8] The system of isolation was now extended to land travelers, and ferries and entrance roads were guarded against diseased intruders.[9] To provide for the growing number of patients, the quarantine station was moved from Spectacle Island to larger quarters on Rainsford Island, and a caretaker was provided.

In Philadelphia the control of the disease was complicated by a great inflow of Irish, Scotch-Irish, and German newcomers. These immigrants, arriving after a prolonged voyage in crowded quarters, brought with them many illnesses, including dangerous infectious fevers.

The first port physician was appointed in 1720 for this reason. He was ordered to oversee "the health of the mariners and passengers" of *all* incoming ships and to require the masters of those with a "suspicion of any pestilential or contagious distemper aboard" to procure a license from the governor before landing goods or passengers.[10, 11]

In 1731, after it had appeared in Boston and just before it became prominent in New York, virulent smallpox broke out once more in Philadelphia. It lasted from January to July.[12] There were probably many susceptibles, a reflection of the fifteen-year interval since the previous epidemic.[13] A resident noted that the ailment had different forms, "not only the distinct flux but another small kind of a different sort from either, wth the black ye purple etc. wch 2 last are generally fatal."[14] Of the 490 deaths in 1731[15] (when Pennsylvania had an estimated population of 7500 inhabitants[16]) "the number of those that died of that distemper is exactly 288 and no more. Sixty four of that number were Negroes."[17]

Apprehension and disagreement regarding inoculation arose in Philadelphia during the 1731 outbreak, but not with the intensity reached in Boston. There the controversy had had political overtones. The conservative city fathers, including Episcopalians, deists, and skeptical physicians led by Douglass, were opposed to the officious sponsorship of the process by the Mathers and their ministerial followers.[18] No such tensions prevailed in Philadelphia. News of the striking benefits of inoculation in Boston must have impressed the Philadelphia city fathers. In 1722, only one out of forty-six inoculated persons died; in 1730, one out of thirty-three. On February 23, the *Pennsylvania Gazette* noted that inoculation "begins to grow among us."

Joseph Growden, who had served on the Council and in the Assembly,[19] was the first prominent subject; probably he received the treatment from Dr. Kearsley, Sr.[20] Franklin,

editor and publisher of the *Pennsylvania Gazette,* made this a conspicuous news item, pointing out how "groundless" were the critical rumors being circulated through the province. On March 4th he reprinted in full the accounts published in 1714 in the *Philosophical Transactions of the Royal Society*, in which the attention of English savants had first been drawn to the process.[21]

Among the outstanding physicians known to have given inoculations in Philadelphia at this time were Drs. John Kearsley, Sr., Lloyd Zachary, Thomas Cadwalader, and Hooper.[22] Dr. Thomas Bond, then [probably] apprenticed to Dr. Kearsley, Sr., recalled many years later that a Dr. Green [Graeme?] had inoculated twenty-nine people in the city, "after having prepared them for a long time with purgations and refreshing remedies. Not one died but most of them suffered greatly."[23] According to Franklin, about fifty persons were inoculated during the 1731 epidemic. All recovered except for one child, whose smallpox broke out "within a day or two after the operation" and who was therefore thought to have been infected before.[24] A generally conservative attitude toward inoculation prevailed in Philadelphia after 1731, reflecting the disrepute with which the procedure was regarded in the western world,[25] even though, as Thomas Bond wrote, "most physicians who had observed its efficacy endorsed it."[26]

Smallpox returned to Philadelphia in the fall of 1736 and continued for some months. The senior Dr. Kearsley reported that a shipload of foreigners started the outbreak, since for the first few weeks the disease had been seen only among Negroes, West Indians, Germans, and other strangers. According to Margaret Fraeme, a member of the Penn family, "the church Bell is not suffer'd to ring but once for six deaths and it has rung twice a day sometime." Learning that one in four died of the illness "taken in the natural way" as compared with one in fifty who were inoculated, Mrs. Fraeme had her son Thomas, Jr., inoculated.[27]

Although Dr. Kearsley thought that "the disease seemed to spread through the city by inoculation," he, nevertheless, remained in favor of the procedure and guessed that about 180 people had undergone the operation that year.[28] The burial records of Christ Church attributed 158 deaths among its parishioners to that disease.[29]

Community inertia with respect to inoculation may have been due in part to a spirit of resignation and submission to "God's will." Many physicians followed Sydenham's opinion that the disease was a natural process which everyone had to experience at least once.[30] Accordingly, a contributory negative factor may have been the fact that very few doctors encouraged inoculation. It is probable also that the fees were so high that few could afford the operation. Nevertheless, in March 1738, the *Mercury,* hitherto wary of the procedure, reprinted an article which urged that all infants be inoculated when an epidemic starts.[31]

In 1733 the constant flow of ships into Philadelphia — many carrying sick Germans — prompted the erection of a reception center on Province Island where sickly passengers were to be held.[32,33]

Smallpox visited Philadelphia again during 1746, this time with few fatalities, possibly because the inhabitants had been exposed so recently. When the first sporadic cases appeared, objections were still being raised to inoculation, despite Kilpatrick's favorable report from South Carolina, on the moral grounds that man had no right to interfere with the work of God.[34]

When Franklin had his daughter Sally inoculated in mid-April, he commented that of some 150 to 160 persons, mostly children, inoculated in April and May, only one had died. In contrast, of the 160 to 170 uninoculated persons of all ages who had had the natural illness, "five died, and all were

sicker than those who had had the inoculation."[35]

At this juncture, in 1749, because of the continuing menace brought on by the great influx of Germans, sick after long voyages in crowded ships, a quarantine law with stricter provisions regarding inspection of ships was passed.[36]

Unhappily for Philadelphia, in 1750 the disease was once more widespread. This was promptly ascribed by some residents to the "inoculating doctors" looking for "extra employment."[37] That November, three inoculated subjects died, and the practice fell into general disfavor.[38]

The outbreak of 1750 and 1751 was more severe and had more fatalities than that of 1746. Peter Kalm reported that Philadelphia had 716 deaths in 1750.[39] The bills of mortality for 1750 have not been preserved; those for 1751 ascribed 47 of the total 146 deaths in Christ Church parish to smallpox.[40]

In this anxious year a medical dispute which surfaced in the lay press proved to be highly significant for the management of smallpox in the American colonies for the next half century. The disagreement began with a popular lecture arranged by Benjamin Franklin[41] and given at the Academy (later the University of Pennsylvania)[42] by Adam Thomson, an Edinburgh graduate. Thomson advocated the use of antimony and mercury in "preparing" the patient to withstand the rigors of inoculation. He based his ideas upon physiologic theories suggested by Hermann Boerhaave, the renowned professor of medicine at Leyden. A vituperative six-month public correspondence with John Kearsley, Sr., ensued. The Philadelphian was irked at Thomson for keeping secret the dosages which he was using and for publicly advocating the use of drugs which Kearsley considered highly questionable.[43] Despite this public exchange, most colonial practitioners adopted the preparatory method.

In Boston strict quarantine procedures may have been responsible for the absence of smallpox from 1730 to 1752. Inoculation was not practiced, lest it spread the infection. But in 1752 the disease was so widespread (7,669 among a population of 15,684) that large numbers sought inoculation. There were 5545 cases of spontaneous smallpox and 539 deaths.[44] Once more the people were defenceless, as this was their first general exposure in twenty-two years.

In 1752 the *Pennsylvania Journal* printed a favorable report on persons inoculated by twenty physicians in Boston during the epidemic.[45] Franklin reviewed the efficacy of inoculation and concluded that of more than 800 Philadelphians inoculated since 1731, only 4 had died of it.[46]

In Philadelphia, when smallpox recurred in June 1756, Governor Morris warned against bringing Indians who had not had smallpox into the area because the "disease is now in Town." Franklin thought it unlikely that the illness might be spread by inoculation [because] those who had been treated were "not yet in the ripe state to communicate infections."[47]

This outbreak was more severe than its predecessors. By November many children, "Six, eight, and Ten a Day for a good while past," had died of it.[48] By early December "since the first of May between 8 and 900 persons have died in it (smallpox), scarce 2 in 5 escaping. This is a large proportion of our inhabitants whose number is not [quite] 23,000."[49] The German population was also hard hit.[50]

The French and Indian War was then in progress. Seeking lodgings, 547 men and officers of the royal forces[51] marched into Philadelphia between December 8 and 13. During the negotiations for quarters there was a heavy snowfall, succeeded by a sharp frost. "In the severe weather the Troops entered the Town, the smallpox raging in

every part, and were crowded into the Publick Houses, where they suffered extreme Hardship and caught the infection."[52]

The military leaders demanded that the Assembly open up private homes for the men. "An additional sixty two beds were needed for one hundred and twenty four soldiers who lay wholly upon Straw in very bad Rooms without Fire."[53] After a forceful confrontation the Assembly made accommodations available, probably in the old building on Market Street which had been the temporary quarters of the Pennsylvania Hospital established in 1751.[54] The outbreak continued until the spring of 1757. The table of mortality for Christ Church ascribed 112 out of 213 deaths in the parish to the smallpox.[55]

In September 1759 smallpox flared again. This epidemic was described as "severe, especially among those not inoculated."[56] Of the 272 burials during 1759 in Christ Church parish, 106 were attributed to the disease. In that year there were 1406 burials in the city, 648 more than in the previous year.[57] One eighteenth-century historian estimated that between 500 and 600 residents had succumbed to the disease.[58]

Inoculation was expensive, seldom costing less than £3.[59] This charge, as well as other considerations, led Benjamin Franklin in 1759 to advocate inoculation at home. Living then in London, he persuaded the eminent English physician, William Heberden, to write a pamphlet on the subject.[60] In his introduction[61] Franklin commented that the pamphlet was to serve as a guide by "encouraging parents to inoculate their own children. . . and thereby save the lives of thousands. . ." He cited the great success of inoculation in Boston [in 1752] where the deaths from it were only "something more than one in a hundred" whereas from the natural smallpox the mortality was one in eleven.

Heberden's instructions, explicit and easy to follow, ignored the elaborate congeries of maneuvers which had been built up around inoculation. In his opinion the best age for giving the injection to children was six weeks, since the infant, still at the breast, was receiving plenty of milk, "which is the best food and physic."[62] Despite this sound advice, physicians continued with the preparatory procedures.

In his pamphlet on smallpox inoculation, Thomas Bond (1713-84)[63] ascribed the introduction of the mercurial and antimonial preliminaries to Dr. William Barnett of Elizabethtown, New Jersey, who, in 1759, had been invited to practice inoculation in Philadelphia and had opened a house for that purpose. (This was in a sense the first private hospital in Philadelphia.)[64]

In 1760 Franklin and Hall issued an educational pamphlet for country people.[65] It was soon reprinted and sold in Boston, and later was published in *Poor Richard Improved* for 1761. It included a description of Heberden's method, a summary of the latest preparatory methods as presented by John Redman, M.D., in a former article in the *Gazette*, and comments by Franklin.

From that time on Philadelphia became a center of inoculation and attracted patients from all the English colonies in the Americas, including the West Indies.[66] Franklin was the first popularizer of inoculation in Philadelphia; Thomson was the second. In other regions there was much more opposition; inoculation was barred in Connecticut, New York, Virginia, and Maryland, and was not taken up in Massachusetts until late.[67]

Boston had its own special problems in fighting contagion during the French and Indian War (1756-63). British troops based at Halifax, who were fighting the French in Acadia, were in constant contact with the New England town. Fearing contagion of the

smallpox, which had broken out among the soldiers at Acadia, the selectmen of Boston closed their port to all ships from Halifax and continued to isolate any incipient cases. Thus they escaped in 1761 with a mild outbreak.[68]

Philadelphia managed to confine its next conflict with smallpox to a limited area. In 1763 the disease erupted among a number of Moravian Indians (Pennsylvania Indians converted by the Moravians). These men were quartered in barracks in Philadelphia[69] for their own protection from hostile colonists. During the outbreak they were described "as being overcome by horror and dread and many sought to escape." Fifty-six — one third of their number — died. The tables of mortality show fifty-six deaths from smallpox in Christ Church parish in 1763 and only six in 1764.

Boston had another episode in 1763-64. Perhaps because of the experience of 1752 and extensive publicity about the efficacy of inoculation, especially with the new preparatory methods used in Philadelphia in 1759, an inoculation hospital was established nearby in Chelsea.[70] Dr. William Barnett of Philadelphia was invited to perform the operation. Professional fees made this a profitable business for the local physicians. Although the selectmen still tried to keep all cases isolated and set up all inoculation centers outside the city, they were unable to prevent the disease from spreading. They therefore dismissed the guards from infected houses and inoculation became widespread. By June 30 there had been 699 cases of smallpox with 124 deaths and 4,977 cases of inoculation with 46 deaths. These figures included about 400 inhabitants of other communities. At this time the population of Boston was 15,500. After the outbreak died down, the old regimen of quarantine was reestablished and the inoculation hospitals were carefully supervised. For most New Englanders inoculation still carried the threat of spreading infection; therefore they opposed it, especially because of reports of deaths among inoculated persons. Nevertheless, in Boston from the 1760s until the introduction of vaccination, the average annual death rate from smallpox fell from 300 per 100,000 to 100 per 100,000.[71]

In 1773 in Philadelphia, smallpox flared once more, causing 300 of the 1344 deaths of that year.[72] All kinds of doctors, from trained men to empirics, performed inoculations.[73]

Inspired by the observation that most of the Philadelphians who had died of smallpox were poor persons who could not afford the expense of inoculation, a Society for Inoculation of the Poor was established under the leadership of Dr. Gerardus Clarkson in 1774.[74] Some inoculations were done at the Almshouse as well. In September 1744 this activity was stopped in Philadelphia because Congress was sitting and several of the northern and southern delegates had not had the disease and were opposed to inoculation.[75]

The protective effects of inoculation were well demonstrated during the Revolutionary War. Smallpox had broken out in Boston during the winter and spring of 1775-6 while that city was occupied by the British. Those British troops who had never had the smallpox were inoculated and protected. In contrast, the colonial forces, made up mainly of young men from the country, were badly hit by the disease.

The Boston epidemic became much more severe later in the summer. A note to a Philadelphia newspaper dated August 4, 1775 reported that "about eight transports were arrived with about sixteen hundred men to Boston exceedingly sickly in the town so that every soldier that now arrives seems to add to their disaster."[76]

In June 1775, after the battle of Bunker Hill, John Morgan, Director-General of Hospitals of the Continental Army, warmly

advocated preventive inoculation,[77] and Washington and his troops were inoculated without asking the approval of the Continental Congress. On March 17, 1776, after the British evacuated Boston, Washington was able to send in 100 inoculated men to take over the city. In July arrangements were made to inoculate the residents of Boston.[78]

Under date of December 19, 1776 a Philadelphia diary states "that the disorder among the poor sick soldiers was better, that not above 3 or 4 died of a day, but that there had died 10 of a day, & that the smallpox was broken out among them, which he expected would make great destruction, as not above one in 50 of the Maryland soldiers had had it, many of them not having a bed to lie on or a blanket to cover them."[79]

Inoculation had now become part of government policy. For example, Congress provided against the spread of smallpox in Philadelphia in 1777 while the city was occupied by British troops.[80]

The experiences of colonial Boston and Philadelphia in attempting to control epidemics of smallpox provide a kind of natural experiment, illustrating ways in which cultural and epidemiologic realities interact.

During the pre-Revolutionary period the Massachusetts Bay colony was mainly settled by and dominated politically by Puritans, a sect with religious disciplines aimed at moral and spiritual perfection.[81] Their ministers were learned men, often graduates of Oxford or Cambridge, schooled in the classics and widely read. Cotton Mather, a leading member of the community, had an avid interest in the newest scientific theories and investigations; he not only encouraged inoculation but tried to dominate the general approach to the disease through his publications. He was thwarted in this effort not only by conservative physicians but also by his political opponents.[82]

In Boston the first signs of an outbreak of smallpox evoked a pre-planned regimen of strict quarantine, isolation, and exclusion of travelers and of traders from neighboring communites. Perhaps as a result, Boston had fewer epidemics of smallpox than did Philadelphia. However, because the intervals between outbreaks were longer, the disease, when it struck, tended to be more widespread and to have higher death rates in Boston than in Philadelphia.

In contrast, Philadelphia was founded by Quakers, who tolerantly welcomed immigrants of all faiths.[83] Their arrival, moreover, also served the economic needs of the area. From almost the founding of the colony, therefore, the population of Pennsylvania was more heterogeneous than that of the Massachusetts Bay area.

Although a lazaretto and quarantine laws for the inspection of incoming ships existed in Philadelphia, no attempt was made to isolate cases of smallpox occurring among residents of the city, or to debar travelers from neighboring communities.

During the early eighteenth century Boston physicians had been trained mainly through apprenticeship and tended to be conservative, whereas Philadelphia's leading medical practitioners tended to be more worldly and more responsive to new concepts such as inoculation. Among these were Thomas Graeme (1684-1772), educated at Leyden, who came to Philadelphia in 1717 and held the office of port physician for many years; Lloyd Zachary (1701-56), who studied under John Kearsley, Sr. and then went abroad to study further for three years; Thomas Cadwalader (1717/18-79), who studied in England under Cheselden and also at Rheims; and Thomas Bond (1713-84), who received instruction in London and Paris and also served as port physician.

Finally, Philadelphia had Benjamin Franklin, a "son of the Enlightenment," who

was wedded to the idea that the advancement of science would increase man's power over nature. His constant expositions in his newspaper, almanac, and pamphlets encouraged the preventive value of inoculation and contributed much to overcoming resistance to the practice in Philadelphia, and thus helped to protect the populace against the disease.

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Memoir of Abraham M. Ornsteen (1894-1978)

By GABRIEL A. SCHWARZ, M.D.

Being a eulogist can be a pleasant experience, for preterit recall may bring up many happy memories. As I have thought about Dr. A.M. Ornsteen, I recall him as an able medical school teacher, as an astounding photographer and an expert cinematographer, as an associate in many medical societies, as a wise director of the practice of medicine, as an authority in medico-legal situations, and as a smiling, helpful friend. One of his features as a physician was his remarkable ability to remember patients' names and histories almost indefinitely. All of these are remembrances of the life of a busy alert neurologic clinician.

Abraham M. Ornsteen was born in Philadelphia on September 30, 1894. He attended the urban school system and graduated from the South Philadelphia High School in 1911. He obtained the degree of Ph.G. in 1913 and later taught pharmacognosy while in medical school. He received his medical degree from the School of Medicine of the University of Pennsylvania in 1917; and he interned at the old Philadelphia Jewish Hospital.

During World War I, he enlisted as a first lieutenant in the United States Army Medical Corps and was trained in the neurologic specialty at the Neurological Institute of New York. In 1919, he started the practice of neurology and psychiatry in Philadelphia and began to do clinical work in the neurologic dispensaries of the Hospital of the University of Pennsylvania and of the Samaritan Hospital. His teaching status was gradually increased, and in 1951 he became Professor of Neurology at the School of Medicine of the University of Pennsylvania. From 1959 to 1961, he was Chairman of the Department of Neurology, but he was not willing to accept this position on a permanent basis. In 1959, he was elected Emeritus Professor of Neurology.

Dr. Ornsteen began in 1925 to take motion pictures of the many interesting neurologic cases he saw. He arranged the clinical material so that he could use it for teaching purposes. This became an important part of neurologic teaching. The neurologic moving pictures showed not only the unusual motor disorders, but also illustrated faking signs and conversion manifestations, to make the students more aware of false neural complaints and how to detect them. He gave this fine, unusual collection of clinical movies to the Department of Neurology of his medical school a few years ago.

He became active in the Neurology Section of the Philadelphia General Hospital from 1930. He soon attained the status of Neurological Chief at that hospital and saw many interesting cases to photograph and describe in the busy neurologic service. He was also active in many local, state and national medical, neurologic and psychiatric societies. He was a Life Member of the American Psychiatric Association and a Senior Member of the American Neurological Association. He was President of the Philadelphia Neurological Society in 1935.

One of the many interesting capacities of Dr. Ornsteen was his musical ability. He taught himself to play the violin, guitar, banjo, mandolin and trombone. In the summer of 1911, he toured the Chatauqua Circuit as a drummer in the "American Cowboy Band," where he was featured as

"Mexican Pete," a xylophone soloist. Indeed, as a drummer in orchestras, playing at nightclubs, restaurants and dances, he helped to work his way through pharmacy and medical schools.

Dr. Ornsteen was also an artist. His hobby of photography was most gratifying to him, for he did all the basic creative and productive work himself. He developed many beautiful photographs. He often sent them to exhibits, won many prizes for his works, and had his pictures published in different photographic journals. On one occasion, he won an award as the third most outstanding amateur photographer in the world.

His practice of medicine was chiefly diagnostic and consultative. He made no attempt to treat patients over a long period of time. His medical writings were chiefly clinical in nature. As a neurologist, he was of considerable value to lawyers and insurance companies in understanding traumatic problems. He was a skilled consultant in court and testified in many cases of murder. His psychiatric interests and skills were as strong as his knowledge of the field of neurology. Many times, I have witnessed his expertness in the fields of both neurology and/or psychiatry when he was "on the stand."

In 1919, he married Miss Hilda Kaplan. She predeceased him in December 1977. They are survived by two sons, Jerome E., a lawyer, and Dr. Richard P., four grandchildren and five great-grandchildren.

In his prime years, Dr. Ornsteen often carried pleasant tricks to show his friends. He invariably had a humorous story to tell. He was never hostile or critical of anyone, although he had disagreements at times and he was a keen, wary man. He was illness-free almost all of his eighty-three years. He lived a gentle, productive and successful life. He died peacefully on April 28, 1978.

Memoir of George J. Willauer (1896-1977)

By JOHN Y. TEMPLETON, III, M.D.

George J. Willauer, M.D., 81 years, surgeon, educator, friend, and esteemed Fellow of the College of Physicians, died at his home, 6129 Green Street, Germantown, on December 19, 1977. Dr. Willauer was born on September 11, 1896 of sound Pennsylvania stock in Stockertown, Pennsylvania. He graduated from Franklin and Marshall College in 1917 and enlisted in the U.S. Army, where he spent two years in the Cavalry. He entered Jefferson Medical College, from which he received his M.D. Degree in 1923. After the traditional two year internship at Jefferson, he spent the year 1926 studying anatomy, gross pathology, and operative surgery at the University of Vienna.

Returning to Philadelphia and to Jefferson, he continued his studies at the Daniel Baugh Institute and was appointed an Assistant Demonstrator of Operative Surgery. At that time, he evidenced his interest in the burgeoning and demanding specialty of thoracic surgery, becoming Director of Surgery at the Eagleville Sanitarium, a position he filled with distinction until 1964. This interest in chest surgery shaped his professional career. Although he was a consummate general surgeon, his most memorable professional achievements lay in the thoracic field, which he devotedly pursued, not only at Eagleville, but also at the Pine Street and Barton Memorial Divisions of Jefferson. His knowledge of tuberculosis was legendary, and his competence in its management in the difficult days before drug therapy was remarkable.

At the same time, he pursued his private practice at Jefferson, sometimes under difficult circumstances, and continued his rise up the academic ladder, receiving the proud appointment of Clinical Professor of Surgery in 1952. He was director of Surgery at Methodist Hospital from 1948 to 1961, making a lasting imprint upon the standards of patient care and medical teaching at that institution.

His often flamboyant approach greatly enhanced his abilities as a teacher, and his direct and forthright view of clinical problems was always refreshing. He was one of those physicians who maintain the chain of knowledge between generations. His willingness and effectiveness as a teacher were treasured particularly by his residents, who demonstrated their appreciation by commissioning the painting of his portrait in 1965, an event of which he was most appreciative and most proud.

A dedicated Fellow of the College, which he supported strongly and held in the highest esteem, and to whose Fellowship he was admitted in 1939, he was also active in other medical societies. He served as President of the Philadelphia Academy of Surgery, the Pennsylvania Association of Thoracic Surgery, the J. Aitken Meigs Medical Association, and the Laennec Society.

His intense interest in Jefferson continued until his death. He was President of the Alumni Association, President of the Thomas Jefferson University Founders Association, and, for three years, Alumni Trustee. He was the recipient of the Alumni Achievement Award and in 1971 was granted an honorary degree by the Medical College. In 1963, he

received an honorary degree from Franklin and Marshall.

An indefatigable worker, he vacationed with equal vigor. He was a highly competent outdoorsman and an expert on the wilderness of northern Maine, stories of which, suitably embellished, were told with great charm to succeeding generations of appreciative interns and residents. He was a gourmet cook, and his dinners of venison and other wild game are remembered fondly by those of his friends fortunate enough to have been included.

Throughout his life, he held strong opinions of right and wrong and unswervingly followed what he regarded as the proper course. He was a fine physician, beloved by his family and patients and no less so by those whose good fortune it was to have had him as a teacher.

GEORGE J. WILLAUER

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